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ORIGINAL COMMUNICATIONS.

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PRIMARY PRINCIPLES OF THE TECHNIQUE OF PLASTIC SURGERY OF THE FACE.

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The present day trench warfare has brought about the needs of plastic surgery owing to the production of the large number of mutilating wounds of the face involving great loss of substance of soft parts and bone. Cases which heretofore seemed hopeless from a surgical standpoint are now brought to a successful issue. Though the literature abounds in case reports and the newer methods now in vogue, few, if any, of the authors describe the actual principles upon which plastic surgery in general, and facial surgery in particular, are based.

In establishing the principles for plastic surgery of the face we must bear in mind a two-fold consideration; first, relief of the deformity and second, to preserve and restore the integrity of the injured parts, it being the duty of every surgeon to restore where possible whatever beauty of form or face his patient possessed before his accident.

While reviewing the recent literature on the subject it occurred to the writer that perhaps it might not be out of place to incorporate the important points of the various authors and his own experience in a brief way. Time will not permit of a detailed discussion or description of each principle, nor is it necessary, as

most of them are self-evident. It is hoped, however, that in the discussion many valuable principles will be added and those given will be further dilated upon.

Happily this special branch of surgery is now being given the encouragement it rightfully deserves, and as we read the many excellent articles, illustrated with actual photographs before, during, and after operation, we must stop and consider whether every possibility has been reached. We think not, and hope not, for now as never before should we be spurred to better results.

We must not lose sight of the fact that these men, returning today as soldiers with deformities, are hailed as heroes, but later as they lay aside their uniforms and enter civil life, unless skillfully treated will become objects of pity, if not of dread to their families and friends.

It, therefore, becomes the duty of each and every one of us to familiarize himself with this special branch of surgery and to become acquainted with the progress so successfully pursued abroad; not forgetting, however, the elementary principles of surgery in general. Naturally, many methods applicable to civil life will be totally unfit for use in the present base military hospitals both from choice and necessity. Military warfare necessitates as rapid a return to active duty as is commensurate with good surgery. They may represent a class of cases extending over a period of months before a final operation completes the result. The first operation should consist in a complete trimming away, with scissors, the sloughing areas of the ragged and mutilating wounds; preserving as much normal tissue as possible and bringing them loosely together with sutures. All that is hoped for from the first operation is the union of the soft parts in such a way as to admit of correcting any serious deformity later by means of a final plastic operation.

The facial defect may be complicated by a more severe bodily injury elsewhere, necessitating a change in the method of choice; for example, a severe injury to the chest requiring daily dressings which would not permit of a flap operation from the arm according to the Tagliacotion method. Here a flap from the forehead according to the Indian method would be more suitable as it would interfere less with the condition in question. In case of an extensive loss of tissue the use of protheses will suffice for the present. The time for operative interference differs depending upon the character and the cause of the defect. In case of injury the plastic restoration should be attempted at once. The decision

of the surgeon should govern the best course to be pursued, whether the case be one of a cosmetic or functional character.

In civil life we have the choice of the method to be employed as the cases usually come for advice long after the accident with scar formation and consequent deformity, but minus the greatest foe to surgical success, infection. Realizing that this one factor above all spells failure, it is possible at least to minimize its occurrence; knowing that all cases received and treated at the base military hospitals are infected, we would advocate, in spite of this, doing as much surgically as would prevent scar formation and consequent distortion later.

No hard and fast rules can govern any surgical procedure and least of all can we prescribe rules for plastic surgery of the face, where so much depends upon the ingenuity of the operator, the structures involved, and in the present warfare the unusual injuries sustained. We would suggest, however, after making a proper survey of the defect to be covered and with a good general idea of the plan to be followed, to employ clean cut incisions, where possible in the natural folds of the skin and obliquely rather than at right angles, as the scar is less prominent and apposition more prefect. In an old injury remove every vestige of scar tissue in order to obtain a normal vascularized surface for the reception of the flap, remembering every unnecessary cut leaves a scar. In recent wounds conserve the musculature when possible by careful suturing as this helps to prevent shirnkage of the scar later, and assists in restoring the power of expression. Accurate formation of the flap in relation to the defect to be covered is one of the essential principles, and success or failure may depend to a great extent upon it. A good safe rule to follow is to make the flap one-third larger than the defect allowing for shrinkage, and in this connection we must not confuse elastic and cicatricial shrinkage, the former occurs at once and the latter to be guarded against by securing primary union. The blood supply of the flap is of the utmost importance, for it is upon this that the life of the flap depends, so always make the flap contain the largest blood vessel in that region. Any interference such as a sharply twisted pedicle will severely jeopardize the life of the flap. The pedicle must be sufficiently long to permit of an easy twist. As early as the fifteenth century this principle was well known to Alexander Benedictus, who first mentioned artificial restoration of the nose, an operation abandoned after the time of Celsus, but again invented independently in the middle of the fifteenth century by lay members of the

family of Branca of Catanea. He adds that these artificial noses badly endure a severe winter owing to poor circulation.

We should have no hesitancy about performing numerous operations upon the same patient if the desired result is obtained. Plastic procedure should consist of as complete a restoration of the face as is compatible with the destructive defects of the original wound and the available skin in the immediate neighborhood of the scars. In plastic operations on the skin it may be necessary to partially remove the scar so as to bring about a better readjustment of the tissues. If the ciccatricial area of the skin is thin, shining, and drawn, only slightly vascular, fibrous and adherent to the underlying tissue it is not to be used in the construction of the flap. If, on the other hand, the cicatrix is well nourished and occupies only the superficial layer of a thick skin and underlaid with fat and without underlying adhesions, it can be used in the formation of a flap.

When suturing, try to suture three-fourths of the circumference, always bearing in mind to avoid tension; rather produce relaxation, as it is much safer. In this connection the fact cannot be too strongly emphasized to have an over correction at the completion of the operation. The amount of retraction which will result from the healing process is an important matter for the consideration of the operator. Plastic surgery at best is a delicate art, requiring a delicate technique, and any great amount of force on the part of the operator may defeat the very purpose, so gentleness should be our watchword. Injury to newly formed mucous membrane must be carefully avoided. Unnecessary handling of the flap is always to be avoided and particularly at this time in the employment of sharp pointed instruments such as retractors, artery forceps, tissue forceps, etc. Even Celsus drew attention to this. The bruising of the tissues carries with it the certainty of injury to the smaller blood vessels and capillaries, which interferes severely with the blood stream to the parts. While it is out of the question to keep the field aseptic, avoid, as far as possible, the introduction of infection foreign to the parts, as the chances of success will be very much enhanced by the employment of aseptic measures, treating recent wounds as potential infections, shunning the retention of secretion, knowing how often it results in the entire loss of the flap. Endeavor always to produce complete hemostasis mindful of the fact that moist blood decomposes readily and is a source of early infection unless careful drainage is established. Should the flap be large and the opera-

tive procedure long, a stitch is left loose here and there and a small drainage tube allowed to remain for twenty-four hours. The day following the operation the wound is carefully gone over with a suction glass to remove any collections of blood or discharge which is to be repeated on the fourth or fifth day.

A good surgical result means less of a triumph to the patient than to the surgeon. The patient looks for more than a good surgical result; he wants the restoration of his features as nearly normal as possible with a minimum scar formation. Careful attention to minor details has an enormous bearing upon the result obtained. This is particularly true of the suture material.

For simple appositions use the smallest suture material obtainable, carefully selecting the finest strands possible. It is claimed for twisted silk that sepsis is less likely to occur and yet holding the parts during the entire time required for healing. The objections to cat-gut are that it softens early, invites infection, thereby causing more or less of a cicatrix. Horsehair or dermal suture on account of its fineness and exceptional strength recommends it for sutures. It can be boiled and has less absorbative qualities than either silk or cat-gut. Michel clamps in place of suture has a definite use in plastic surgery. They can be readily sterlized either chemically or by boiling. The rapidity with which they they can be placed is a distinct advantage, especially in base military hospitals where time counts for so much. It is claimed for the use of the clamp, owing to its method of application, that there is less scar tissue formation. In tying knots see that they do not rest upon the line of union as they are likely to interfere with rapid healing and cause unsightly and uncertain results. This can be avoided to a large extent by placing the sutures some distance from the edge of the wound.

When both the skin and mucous membrane are wounded at the same time, separate sutures of the divided structures is required. This is particularly true of the eye lid. Perforating wounds of the oral cavity, if permitted to cicatrize, leave fistulous openings through which liquids that are taken into the mouth escape, as well as mucus and saliva. It is a good plan, especially in superficial wounds, to remove the sutures early unless for some special reason we wish to retain them longer, as the possibility of a stitch scar or the occurrence of a stitch abscess is thereby reduced to a minimum. To relieve tension, when necessary, the chief support is given by deep nickel wire sutures; these sutures should not pass through the mucous membrane. They are placed from one to

one and a half centimeters part, tied over plates placed on sound tissue so tightly, that the wound margins are brought together, thus taking all strain off the superficial sutures. The plates must be so placed as not to interfere with the blood supply. This is particularly useful for diminishing recent defects. It is the practice at the present time abroad to use the open method of treating wounds, where there is no special reason for bandaging. The advantages claimed are many, especially in the presence of the secretions of the mouth, nose and eye. The skin does not macerate, but remains dry, diminishing the growth of bacteria and preventing infection. The access of the light and especially sunlight to the wound acts as a stimulant and disinfectant to the tissue. Again, the uncovered wound allows of frequent inspection. The patient is likewise spared the unpleasantness of daily dressings, which are more or less painful, not to mention the enormous saving in dressing material and the saving in time to the attending surgeon. Absolute immobilization of the wound is a principle acknowledged everywhere.

The main object as stated in the title, was merely to outline briefly the primary principles of the technique of plastic surgery and to mention the necessary qualities for attaining the best results directed toward as complete a restoration of the original tissues as is compatible with the destructive effects. The extensive ground that has to be covered precludes the possibility of devoting more than passing attention to any one topic of plastic procedure. It is a fair conclusion, I believe, from what has been said, that with discrimination, judgment and the necessary experience, plastic surgery of the face should find a legitimate and established place for the relief of defects and the readjustment of injured tissues.

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Tumors of the Temporal Lobe. P. CIUFFINI, *Policlinico*, Feb., 1918.

In two operative cases, which are described in detail, the hearing and the sense of smell were affected at an early stage of the growth. Word amnesia was pronounced in one case, also a tendency to sensory disturbances and aphasia. In one case there was Jacksonian epilepsy originating on the paretic side of the body; in the second case there were no signs of such spasms. ED.

AN OPERATION FOR BONY OCCLUSION OF THE POSTERIOR NARES.*

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The bane of operations for bony occlusions of the posterior nares has been the difficulty of obtaining a permanent opening. The cases are so rare that the operator sees only one or two in a lifetime, so that he has small opportunity for observing the results of the different methods of operative procedure. Bony atresia of the posterior nares has been recognized for nearly a century, Otto in 1830 being the first to describe this condition, although he had observed it only in a human foetus. The first actual case in the living was reported by Emmert in 1851.

In 1886, Hubbell gave a brief resume of the cases reported in medical literature, together with one of his own. These numbered seventeen and had been operated upon by various methods, the results being by no means satisfactory. Hubbell's case was one of congenital bilateral atresia, which he operated upon by a half-inch hand drill. Good sized openings were made, but these closed so that a secondary operation was necessary, after which tubes of blocked tin, 10 millimeters in diameter and 5 centimeters long, were inserted and worn for six weeks. The final result was good.

Clark, in 1898, reviewed the cases reported, twenty in all, and added one of his own. His patient, an undersized girl of eighteen, had an occlusion 9 millimeters thick near the septum and but 2 millimeters where it joined the outer nasal wall, this being the reverse of what is usually found. An opening 11 by 13 millimeters was made by an electric trephine. The relief was permanent, as the patient was seen by Dr. Clark some ten or twelve years after the operation.

In 1904, Schmiegelow gathered from the entire medical literature 61 cases of atresia, most of them osseous. Fraser, in 1910, gives the number as 108, while Pfingst, in 1914, reported the number as considerably over 100. He had a case of bilateral bony occlusion where the operation was done under local anesthesia. A

*Presented as a candidate's thesis to the American Laryngological, Rhinological and Otological Society, Atlantic City, N. J., May 30, 1918.

button of bone ⅜ of an inch in diameter and 1/16 of an inch thick was removed from one side by a hand trephine. The operation was so painful that the patient refused to have the other side touched, and when she was examined eight years later only a very small opening was found.

Pfingst is the only writer, with the exception of Katz, I have found, who refers to the removal of the posterior end of the septum as the advisable procedure. His interpretation of the *Katz method* is as follows:

"Under local anesthesia three or four holes are drilled with the electric drill and these connected by saw or punch. When the obstruction is anterior to the posterior edge of the vomer, the free or posterior end is removed, thereby creating a larger opening."

A glance through the standard American text books from 1893 to 1917 reveals a rather scanty source of information, but interesting inasmuch as it shows a growing comprehension of the subject.

In Burnett's System, published in 1893, Seiler says that: "Congenital synechia in the shape of a bony ridge across the posterior nares is sometimes met with, but is of exceedingly rare occurrence."

In 1899, Roe (De Schweinitz and Randall) says that bony occlusions of the posterior nares "should be removed with either a drill or bone cutting forceps. Great care must be exercised, for the position of the bony formation frequently renders the operation extremely hazardous."

Shurly, in the 1900 edition of his book, writes that "posterior atresia if bony is best relieved by the use of a very narrow chisel, or, in favorable cases, the drill, followed by the insertion of plugs to keep the surfaces apart."

Cradle, in 1902, in speaking of this operation, says: "Operations on bony plates closing the choana are more difficult" (than the membranous ones). "They are painful and bloody. The posterior wall of the pharynx must be guarded by the surgeon's fingers or still better by a suitable bent plate introduced through the mouth. The diaphram can be pierced by a stilet and the opening enlarged by the saw or chisel. It is much better to make a large opening at once than to attempt to enlarge it subsequently by any mechanical means. Sometimes a tube must be worn for weeks. Among the recorded operations, some of them of recent date, there have been various accidents, such as middle ear infection and even an occasional death."

In Bosworth (edition of 1893), and in Kyle (1899), I was unable to find any reference to this condition, which was also true of

Coakley (1901), of Ballinger (1908) and Wright and Smith (1914).

Loeb (1917) says: "Bony occlusion of the posterior nares, unilateral or bilateral, may be relieved by removing the bony mass by means of chisels or burrs driven by a dental engine. After the opening is made it may be enlarged by cutting forceps. Some operators remove the bony occlusion through a submucous resection, but there is no advantage in this procedure and the difficulties of the operation are greatly increased."

This submucous resection method however, is given the preference by most of the later writers. Thus, Richardson, who has given us a masterpiece on this subject, says that the method suggested by Uffenorde seems ideal.

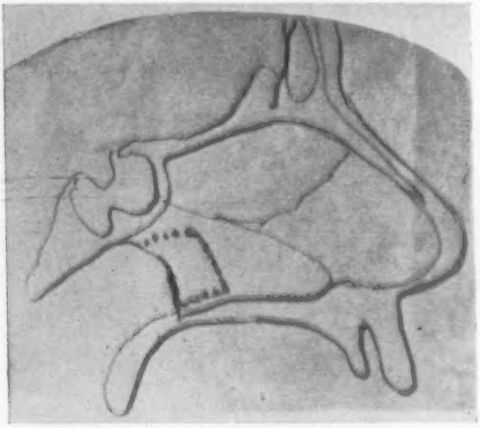

Fig. 1. Diagramatic view of nasal septum. The dotted lines indicate the approximate amount of septum to be removed.

"In this operation the muco-periosteum is raised on the septum down to the obstructing plate, from the anterior surface of which it is gradually separated until its outer border of attachment is reached. The flap is then thrown well outward and the bone plate is removed by chisels and conchotomes. After the bone partition is thoroughly removed the flap is replaced and an incision is made vertically through the middle of the muco-periosteal flap, which covers the nasal surface of the obstructing plate. Expanding forceps are now introduced and the redundant muco-periosteal flap is made to coapt and cover the whole margin of the bone wound."

As to the frequency of postnasal atresia, while comparatively

few cases have been reported (probably not over 150), it is probable that there are many cases in the new-born which are never recognized, the victim passing away in the first few moments of its existence.

Richardson has reported a most instructive case of atresia in an infant, and he well says that "many cases of this kind of deformity have been in the past, and even at the present time, are unrecognized at birth as such, and when speedily dying, as a result of the obstruction to respiration, are placed under the general class of asphyia neonatorum."

This same thought had been emphasized by Dr. Clark, who says: "This condition is one of such rarity, judging from the literature on

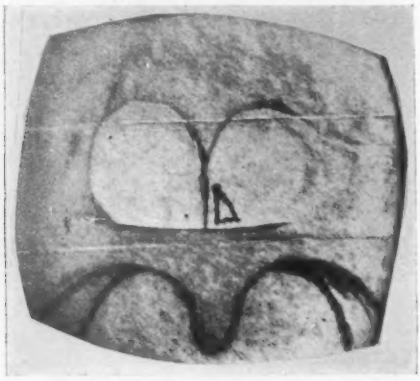

Fig. 2. Diagramatic view of posterior nares showing bony obstructions. The triangle indicates first portion to be removed.

the subject, that it at first seems of little practical interest to the physician; and yet there is no doubt that infants may die from the want of knowledge on the part of the family doctor of the possibility of the existence of such an abnormality. * * * Many infants must have died from this condition in whom it was never recognized. And when one considers the serious handicap that such a condition must be to the infant in its struggle for existence, I think the greater wonder must be that any such cases have lived to grow up."

Attal also says that when both choanæ are involved the new-born succumb either by asphyxiation or debility, due to obstructed breathing and difficulty in nursing. He advises immediate intervention

and recommends a gouge and mallet and the use of rubber tubing to keep the passages open.

Koch reported the case of an infant of eleven months, who had purulent rhinitis involving the accessory sinuses so that it was most urgent that nasal respiration and drainage should be established. The osseous obstruction was removed, first on one side, then three weeks later on the other. There was complete cure in six weeks with great improvement in the general health.

Goez likewise operated on an infant for double bony atresia. The bone was thin and a trephine was used. A secondary operation was necessary and celluloid bougies were used once a week.

Fig. 3. Diagramatic view of removal of one of the bony obstructions, and the first step toward removal of the other.

Heredity does not seem to be an important factor in this type of deformity. Some writers mention that other members of the family had nasal obstruction, but do not see the cases so as to make a definite diagnosis. Lang, however, cites several cases of choanal atresia extending through three generations of the same family, but Richardson takes him to task for his deductions, saying that "Lang attempts to prove the hereditary nature of this disturbance without any facts to substantiate his contention."

"Lang saw," he says, "several cases in the one family, and even went so far as to include a deceased child whom he had never seen and from this occurrence deduced the hereditary nature of the deformity."

As to the pathogenesis of congenital atresia various theories have been advanced. Lushka and Schwendt believe the condition is due

to a proliferation upward and backward of the palate bone. Kahler and Kundrat regard it as due to an overgrowth and extension inward of the vertical plates of the palate bone and mention the fact that the lateral part of the occlusion is usually thicker than the median. This condition was marked in my first case but not in the second. Hopmann thinks that originally there existed a high degree of choanal stenosis which, with extreme deviation of the vomer and approximation of the internal pterygoid process of the sphenoid, eventuates in complete occlusion. Bitot differs from all these and claims the obstruction is an independent bone as indicated by its sutures.

Fig. 4. Diagramatic view of result of completed operation after removal of the bony obstructions and the posterior end of septum.

That the condition might be due to some embryonal activity or the reverse has been likewise discussed, and the usual different theories advanced. The most plausible explanation is that given by Hochstetter, Tiemann and Keibel, who maintain that the primitive nasal cavities are from the first separated from the mouth and pharynx and form a blind cul-de-sac. The floor of these primitive nasal cavities is formed by the union of the lateral with the mesial nasal process, and is made more solid by the proliferation of the mesoderm between the two epithelial layers. The posterior part, however, continues as an epithelial layer and, as the nasal cavities elongate, ultimately reaches the naso-buccal membrane, which finally gives way. In cases of atresia it is possible that the naso-buccal membrane becomes permeated by mesoderm and therefore fails to break down.

Choanal atresias have been divided into two classes:

(1) Those where the posterior end of the vomer extends beyond the atresia. These have been called by Schwendt the typical cases; and

(2) Those where the obstruction is on the same plane as the posterior, under which heading both of my cases are classed.

The following is Hochheim's report of the histological examination of a specimen of bony atresia:

"In structure (the bone) corresponded to the hard palate. It consisted, as the hard palate, of the centrally placed plate of bone, which on the one surface, was lined with muco-periosteum corresponding to the nasal cavity, and on the other of the muco-periosteum corresponding to the postnasal cavity modified in the respect that in this are found mucous glands, and the epithelia are columner instead of the flat epithelia."

Two specimens of choanal atresia have been obtained and studied by Hamilton and Fraser. Hamilton's specimen came from a patient who died of pulmonary tuberculosis. "After maceration it presented," says Hamilton, "the following appearance:

"The bony septum is quite straight. * * * Both choanae are occluded by bony plates, in each case diaphanous in the central part, their attachments being: the anterior, as far forward as the junction of the superior maxillar and the palate bones; their lateral, on the outer side, to the internal wings of the pterygoids; on the inner, to the posterior margins of the vomer, and their superior and posterior, to the basilar process of the occipital bone; the septum projects at its base behind the plane of the plates, which latter, it will be thus seen, instead of being perpendicular, to pass from above and behind downwards and forwards, forming the septa, almost approach the horizontal."

Fraser's specimen came from a case of unilateral atresia that died from leptomeningitis from an old otitis media suppurativa chronica. He discussed his findings as they coincided or differed from the various theories advanced to explain this abnormality. As his case showed marked asymmetry of the hard palate, he cites the two theories advanced to explain the effect of mouth breathing on the shape of the palate.

"Siebenmann, Fränkel, Grossheintz, Haag and Buser take the view that a high palate is only part of a congenitally high and narrow formation of the facial skeleton," while "Bloch, Körner, Waldow, Alkan and Bentzen are of the opinion that mouth breathing produces an abnormally high palate on account of the pressure of

the stretched cheeks on the lateral part of the alveolar arch, and also because of the want of counter pressure of the tongue on the roof of the mouth."

After a failure in my first operation, which I felt I had done thoroughly, following Uffenorde's method as nearly as possible, it occurred to me that if the raw surfaces were farther apart, the danger of closure would be greatly lessened; and remembering also that perforations in the septum usually stay open it seemed to me that the logical thing to do would be to make a perforation in the posterior end of the septum involving the obstructing choana.

As far as I have been able to find by searching the literature, no cases have been reported where this method was followed. I thought the idea was original but find that Katz speaks of it as follows:

"Lateralwärts gelangt man dabei nicht soweit infolge der räumlichen Behinderung durch die vorliegenden Teile, besonders durch die Muscheln; dagegen wurde medialwärts im grossen Umfange reseziert und vor allem vom hinteren Vomerrande alles Erreichbare entfernt.

"Wer sine hinreichend grosse Offnung angellegt und vor allem den hinteren Vommerand ausgiebig reseziert hat, fur den wird sich die Nachbehandlung relativ einfach gestalten."

The posterior nares are formed by the vomer and nasal crest of the palate bone internally, the sphenoids above, the horizontal plate of the palate below and the pterygoid processes externally.

Figure 1 gives a side view of the septum and the dotted line the approximate area to be removed. A fairly generous section is outlined, as it seems better to err here on the side of too great rather than too small an amount. For the operation I have used both local and general anesthesia, but prefer the latter, especially where there is double occlusion. Ether, I feel, should be given a decided preference over chloroform, especially when the operation is done in the upright position. There is an element of danger and Loeb, who has reported a death from chloroform, advises that "wherever possible local anesthesia should be employed, as these patients, like others suffering from congenital malformations, do not bear general anesthesia well." Deflection of the septum or hypertrophy of the turbinates should, of course, be corrected before attacking the atresia, as it is essential to have the best possible operative field. It is hard to see through these noses, which are usually small and narrow. After the free use of adrenalin to obtain a bloodless field,

the obstructing bony plate can be readily perforated with a long flat chisel held close to the septum. A triangular section, as outlined in *Figure 2*, is first removed, the forefinger being placed in the posterior nares to guard against accident. The bone is next punched out as thoroughly as possible and the rough edges smoothed off with a mastoid curet (see Figure 3). When the atresia is bilateral the other side is operated on in the same way. The posterior end of the septum is then removed by rongeurs or curet, and after being smoothed off carefully, for it is quite brittle, it is covered by the mucosa which has been previously cut and elevated so as to leave enough for this purpose (see *Figure 4*). All shreds should be carefully removed and the nose wiped clean. Each nostril is then packed with a strip of gauze covered with Cargile membrane or rubber tissue. The packing should be removed in 24 hours, and the subsequent treatment is only such as needed to keep the nose clean and free from crusts. If the operation has been done thoroughly, no further packing is necessary, nor will there be need for the wearing of any of the many devices recommended to keep the openings patulous.

I beg to report the two following cases:

Case I.—Mr. H———, 50 years of age, a newspaper editor from Prince Edward Island, was referred to me by Dr. Leard of Boston, on November 7, 1913. He gave a history of having had obstruction in the right side of his nose as long as he could remember, and of having been examined by many doctors at home, all of whom told him the obstruction could not be removed without endangering his life.

Upon examination I found the right side filled with a large quantity of offensive tenacious mucus. This was constantly drooling from the nose, and while he made continuous use of his handkerchief, he presented a pathetic spectacle. There was a marked deflection of the septum to the obstructed side, and a polypoid degeneration of practically the entire mucosa. The naso-pharyngoscope and rhinoscopic mirror showed complete occlusion of the right choana, the obstruction being on a plane with the posterior end of the septum. There was slight asymmetry of the face and a rather high hard palate; the eminence of the right Eustachian tube seemed much nearer the median line than the left, a condition I later noted on digital examination when the patient was under ether. This malposition of the tube has not been noted, as far as I have been able to discover, and may have considerable bear-

ing on the etiology. In order to reach the obstruction it was necessary to resect the anterior half of the septum, and to remove considerable of the degenerated mucous membrane. Under ether an attempt was next made to remove the bony wall across the choana in accordane with the method described by Uffenorde. After elevating the mucosa over the posterior portion of the septum and bony plate and pushing it as far over as possible, an opening was made with a long chisel through the bony atresia close to the septum and a considerable area punched out with a sphenoidal punch. The bone near the septum was thin and easily removed, but outwardly it became very thick and was extremely difficult to get out. An opening about 10 millimeters in diameter was eventually obtained. The mucous membrane was then put back into place and a vertical incision made through the central portion of the section originally covering the obstruction. This was packed tightly against the edges of the bone with iodoform tape. The wound healed well and the patient went home three weeks after the operation. Three months later he returned and I found that the opening had almost entirely closed, so that a second operation was necessary. This was done under local anesthesia. The operation was performed practically as outlined in my description. An area about the size of a dime was removed from the posterior portion of the septum and the nose lightly packed with a 5-inch strip of tape surrounded with Cargilie membrane. This was removed in 24 hours, the nose was cleansed daily for ten days, when the patient went home. Eight months later he returned and I was pleased to find that he had a good sized opening through which he was not only able to breathe, but what to him was of far greater importance, to blow the nose. There was no accumulation of mucus, a normal looking musoca and an improvement in the senses of both smell and taste.

On April 18, 1917, more than three years after the final operation, he wrote me as follows:

"With reference to the good work you performed on me, it is a perfect job. The right nostril (the operated one) is still better than the left and gives me no trouble. The opening in the back wall is free and clear."

Case II.—Miss H. E———, age 18, of Lee, Maine, was referred to me by Dr. Way of Lincoln, Me. She was admitted as a house case at the Massachusetts Charitable Eye & Ear Infirmary on March 31, 1916. She gave the following verbatim history:

"I am nearly 18 years old and I have never been able to breathe through my nose, nor to smell anything at all. I have, from birth,

a bony growth in my nose which completely closes that passage between my nose and throat. When I was a few months old my mother took me to Bangor, Maine, and had my nose examined by two different nose and throat specialists, but they could not do anything for me. Last summer I went to the Maine General Hospital and all the doctors in the hospital examined my nose and throat. They said that they had never seen a case like mine before and that there was no one in the State of Maine that could perform the operation successfully."

The patient was well developed and seemed rugged; had no sense of smell and taste was poor. The face was symmetrical and although a mouth breather, the hard palate was not high. The hearing had always been good and both drum membranes were normal. While there was some lack of resonance in her voice, she was able to enunciate plainly; the nose was rather narrow; the septum in the median line and thick at base; the mucous membrane was fairly normal and there was but little excess of secretion, thus differing markedly from the first case. The choanal obstruction could be seen both anteriorly and posteriorly. The vault could be made out and was normal. The eustachian eminences were in their usual position and not unduly prominent as in Case I. The choanal obstructions appeared as rounding protrusions covered with normal mucous membrane. They seemed to be attached to the posterior end of the septum and not anterior to it.

The operation was performed by me on April 1st, the patient being under ether about 40 minutes.

The following report was copied from the Massachusetts Charitable Eye & Ear Infirmary records:

"The bony partitions occluding the posterior nares were removed by chisel and biting forceps, part of the posterior portion of the bony septum was also removed, thus throwing the posterior nares into one cavity."

A rubber tube was placed in each nostril and a postnasal plug inserted. These were removed in 24 hours and no further packing used. The patient was discharged April 25th, practically well. The subsequent history of the case can best be told in her own words, written seven months later in response to my inquiry:

"My nose and throat were sore for a short time after I left the hospital, but when my throat was healed so that I could eat anything that I wished I found that food tasted much better. I can now smell as well as anyone, and I can breathe freely through both nostrils. The shape of my nose has changed, it used to be rather

soft and shapeless, but now it has a much better shape. My lips do not stick out as they used to, and my lower jaw is not dropped down as it was once. I think my memory is better and I enjoyed my walk, to and from school, as I never had enjoyed it before, because I could smell the fragrant spring flowers."

From the foregoing letter it is evident that the senses of taste and smell have been greatly improved and that a considerable change has taken place in her facial expression, as some writers, especially Schrötter, have mentioned. On October 16, 1917, her physician wrote as follows:

"Miss H. E——— is breathing through her nose and the operation was entirely successful."

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THE RADICAL MASTOID OPERATION: INDICATIONS, TECHNIQUE AND RESULTS.*

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The first conception of the radical mastoid operation was indicated by Nature when she converted the mastoid process, antrum, middle and external ear into one cavity and lined it with skin. This idea has been improved upon until the present day shows the operation to be a perfected and safe surgical procedure, recommended by such men as Politzer, Bacon, Whiting, Dench, Kerrison, etc. In spite of this fact, however, a review of the otological literature shows quite a number of men who not only refuse to commend the operation but actually condemn it.

There seem to be three reasons for this: First, the operation has been recommended and attempted in many cases where it was not indicated; second, it has been attempted by men who have not taken the trouble to thoroughly familiarize themselves with the technique, consequently their results have been poor and the operation has received the criticism which should justly have been directed to the operator; third, proper attention has not been given to the after treatment, which feature, if neglected, will certainly result in the failure of the operation.

The object of the writer in presenting the following cases is to show what results may be expected from the average radical mastoid operation and,—while time and space do not permit a detailed discussion of the indications and technique of this procedure,—I would like to say a few words concerning some of the steps essential to success, though I do not think all cases of aural suppuration require a radical mastoid operation.

Generally speaking, the chronic infections should be divided into three classes: (1) Those cases of intratympanic infections with little or no involvement of the attic; (2) those cases involving not only the tympanum but the attic, antrum and,—to a limited extent,

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—the mastoid; (3) those cases involving the intra-tympanic attic, antrum and mastoid structures as well.

The infections in class one are mucous membrane infections rather than an implication of the bony tissues, the discharge (usually coming from the Eustachian tube) being of a mucoid character; the hearing is usually good. The condition is in no way a menace to the patient's life, and aside from the inconvenience occasioned by the presence of the discharge, the patient suffers no ill effects. These cases rarely, if ever, require a radical operation, whether the discharge has been present one year or twenty.

In the second class of cases we begin to tread on dangerous ground, because when we include chronic infections embracing the attic we include one of nature's favorite pathways to the brain. Some of these cases are of the border line type, and require quite a little study and judgment in deciding whether or not operation should be performed, and the proper decision can be reached only after a careful consideration of the case as a whole. The amount, character and duration of the discharge, the evidence of bone destruction, indicated by polypoid tissue, foul odor of the discharge, exposed and roughened bone disclosed by probing, the amount of hearing; the subjective symptoms,—as pain, headache, dizziness, etc., and, in many instances, the progress of the infection where careful and judicious local treatment have been carried out,—have all to be carefully correlated in order to form an accurate opinion.

Needless to say, certain types of direct attic infection where the perforation is high up,—even though it be small, and the discharge foul, scant, and at times intermittent, are very dangerous and should be operated upon at once, since they are a direct menace to the patient's life.

The infections in class three are those in which the radical operation is most frequently indicated. These cases are generally seen in the clinics of the large cities, the otitis having been acquired from some of the infectious diseases of infancy or early childhood, and neglected or given little or no treatment through a number of years. It is in these, together with some of the attic infections, that we get many of the facial paralyses, intracranial and labyrinthine complications. The hearing is generally very poor, the tympanum filled with foul smelling pus and granulation tissue, the ossicles necrosed and the mastoid shows a general involvement or is completely sclerosed. All cases of cholesteatoma, facial paralysis and intracranial complications call for immediate radical operation.

The one factor upon which a successful operation depends is the thorough eradication of all the diseased tissue from the cavity,—whether it be from the bone, the muco-periosteum, or the mucous membrane.

The different steps of the operation are familiar to all, and require no enumeration here.

After the antrum has been entered and the bridge between the dural plate and the facial ridge removed and the facial ridge reduced to the lowest limit of safety, the epitympanum or roof must be cleared out. This requires the thorough removal of all zygomatic cells, leaving the hard, smooth, white dural plate; the anterior wall thinned out, and then the hypthmpanic space obliterated, by removing the remains of the annulus tympanicus and any cells which may be found, so that there is no reservoir left in which the discharge may collect.

The Eustachian tube should then be thoroughly curetted, removing all muco-periosteum and lowering the ridge of bone at the outer rim; next, diseased mucous membrane should be removed from the internal wall, especially in the region of the round window and in the space between the oval and round windows and the facial ridge. There are usually a few cells here and it is the one point usually neglected and most difficult to clean out.

Finally, as a last procedure, the entire cavity, including the tube, should be thoroughly inspected for any remnants of diseased muco-periosteum or granulation tissue, for upon the thorough removal of all debris depends the success of the operation. The cavity should then be packed with a piece of gauze dipped in adrenalin, 1-1000, and the flap cut, after which the cavity is packed with iodoform gauze, care being taken to leave the field free from blood.

There is no other operation in surgery in which more attention is required to the details or in which a more diligent after treatment is required.

The object of the operation is to have the cavity thus prepared become lined with skin. The only way to accomplish this is to keep down the granulation tissue. This can be done by the persistent and personal care of the surgeon and upon success here depends the results, especially the hearing.

In other words, if a layer of granulation tissue is allowed to cover the inner wall, it acts as a blanket and,—allowing for the diminution in hearing incidental to the removal of the drum, malleus and incus,—the hearing depends upon the amount of granulation tissue allowed to cover the internal wall; therefore, the thin-

ner the blanket the better the hearing; the thicker the blanket, the poorer the hearing.

In order to obtain a definite idea of just what to expect from the ordinary radical operation, the writer has taken ten consecutive cases in which a radical operation was thought necessary and operated upon them in his ear clinic at the New York Polyclinic Hospital. These cases are presented here tonight so that you may see for yourselves the results obtained.

The duration of the discharge varied from ten to twenty years. The length of time since the cases were operated upon ranges from one to two and a half years.

These ten cases were shown at the meeting of the American Medical Association in June, 1917, at the New York Polyclinic Hospital. Nine were dry at that time; one had a slight mucoid discharge from the tube,—that case has also an atrophic rhinitis. Following is a brief report of each case, with post-operative hearing.

Cases I and II.—Alice C., age 15; discharge for 14 years, following one of the infectious disease of infancy. Both tympanic cavities completely filled with granulation tissue; discharge profuse; very foul odor. Has had several treatments for several months, with repeated removal of polyps, and applications of silver nitrate. Has stopped school on account of pain and headache; hearing very bad; spoken voice 2 feet, and at 256 Fork (C^1) faintly heard in air.

Radical mastoid operation, right side, September 30, 1915. One month later, left radical mastoid performed on account of pain and headache. Both ears dry about 8 weeks following operations. You will notice a secondary or manumetric membrane present in the left ear.

Hearing about same in both ears; air conduction at 64; Fork (C^{-1}) about five seconds; watch, 12 inches; accumeter, 20 feet; whisper, 20 feet; spoken voiee, 35 feet.

I am glad to be able to present this case for your inspection since the hearing is unusually good, considering the fact that she has had a double radical operation. She hears ordinary conversation without difficulty; finished high school, took a course in stenography, and has been working for some time. Hearing very much improved.

Case III.—Maria F., age, 33; discharge for 31 years; hearing very poor; foul odor; no results from long continued local treatment.

Radical operation March 2, 1916. Mastoid sclerosed; antrum, attic and tympanic cavities filled with polypoid tissues and pus; ossicles destroyed. Granulations were very profuse, and the internal wall was kept free with much difficulty, but finally in about nine weeks a dry cavity was obtained. Hearing very much improved. Air conduction, C Fork (128); watch, 4 inches; acoumeter, 6 feet; whisper, 6 feet; spoken voice, 15 feet.

This patient has been relieved of a direct menace to her life, and has a dry ear with much improved hearing after a discharge of 31 years.

Case IV.—Mary M., 28 years; double discharge since infancy.

Radical mastoid operation May, 1916. Unfortunately, this patient is ill from some other cause and could not be present tonight. Her case is interesting, since she hears better in the side which had the radical operation.

Hearing operated side: Air C-[1] Fork, 64; watch, 8 inches; whisper, 8 feet; acoumeter, 8 feet, and spoken voice, 18 feet.

Case V.—Marjorie C., age 19; discharge since childhood; very foul odor; drum membrane gone; hearing very poor.

Radical operation, May 1916. Cavity completely dermatized except small area right at mouth of tube; at times there is a slight macoid discharge; other times completely dry.

Hearing: Air conduction C-[1] Fork faintly heard; watch, 8 inches; whisper, 15 feet; acoumeter, 15 feet; spoken voice, 30 feet.

This patient has a bad atrophic rhinitis and the discharge from the tube, when present, is of a mucoid character and not purulent. Hearing very much improved.

Case VI.—Bernard H., age 18; has a discharge of 15 months' duration from a small sinus behind ear, following a simple mastoid operation at some other hospital. I advised a secondary operation and patient refused. Local treatments tried for about six weeks with no results. Foul odor from middle ear, and at this time sagging of posterior superior canal wall noticed, and immediate operation advised.

Upon making the incision and laying back periosteum the lateral sinus was found very far forward, being practically against the posterior canal wall and exposed about three-quarters of an inch. Removal of part of the posterior canal wall showed cholesteatoma. Radical operation, June, 1916.

Cavity dry in about nine weeks. Hearing: C Fork; air, whisper, 4 feet; acoumeter, 6 feet; watch, 6 inches. Hearing same as

*$C^1 = 64$.
$C = 128$.
$C^1 = 256$.

before operation. You will notice the round window plainly visible in this case.

Case VII.—Pearl W., age 17; discharge for 15 years; hearing very good; very foul and profuse discharge; cholesteatoma suspected.

Radical operation, July 20, 1916. Ossicles destroyed, but no cholesteatoma found. Secondary skin graft ten days after operation.

Ear dry in 8 weeks, and a secondary or manumetric membrane found here almost closing over the cavity.

Hearing unusually good. C-1 Fork 64, several seconds in air; watch, 18 inches; whisper, 20 feet; acoumeter, 20 feet; spoken voice, 35 feet. Patient notices practically no difference in hearing between the operative and normal ear.

Case VIII.—Harry M., age 16; discharge for 16 years; very foul odor; drum completely gone; hearing poor.

Radical mastoid operation October 18, 1916. Large cholesteatoma found; no exposure of sinus or dura; ear dry about 8 weeks after operation.

Hearing: air conduction 128 Fork, or C 10 seconds; watch, 4 inches; whisper, 6 feet; acoumeter, 6 feet; spoken voice, 10 feet. Hearing about same as before, according to patient's statement.

Case IX.—Lura H., age 32; discharge for 15 years. Referred to me by Dr. C., with history of headaches and chills at times; no temperature on examination in clinic; sent in for operation 3 days later, and on admission chill occurred and temperature jumped to 104. Blood count and culture negative, and no signs of meningeal involvement found.

Radical operation next day, October 22, 1916. Ear completely filled with polypoid tissue and pus; temperature came down following operation, and ear became dry in about ten weeks.

Hearing practically gone before operation. Post-operative hearing: C Fork 128 in air several seconds; watch, 8 inches; whisper, 15 feet; acoumeter, 12 feet; spoken voice, 25 feet.

Hearing very much improved; no recurrence of headache and chills.

Case X.—Albert H., age 30; discharge for 27 years; long continued local treatment; hearing practically nil.

Radical operation, November 4th, 1916. Daviry dry in ten weeks; much difficulty in keeping granulations from internal wall.

Hearing 128 Fork, air several seconds; watch, 10 inches; whisper, 15 feet; acoumeter, 15 feet; spoken voice, 25 feet. Hearing very much improved.

Case XI.—This case I wish to add, since it shows so well what happens when the ear fills with fibrous tissue.

Dant-M., 28 years of age; brought into Polyclinic with a temperature of 104, neck partly rigid; partial Kernig. * * * Examination showed completely prolapsed auditory canal, right side with very foul odor.

Immediate operation. Removal of cortex showed an unusually large cholesteatoma, with sinus and dura exposed over both tempero-sphenoidal and cerebellar areas. It is very difficult to see how this patient escaped an intracranial complication, but his symptoms cleared up following a complete radical operation, October, 1917. Hearing practically nil due to fibrous tissue.

Observations.—The one thing I attempted to do in the after treatment of these cases was to keep the internal wall free from granulation tissue. To my success here I attribute the hearing obtained in these cases. The results obtained in the case on which the double radical was performed show what may be expected in the most successful cases.

The routine in these cases was to get the cavity as dry and free from diseased tissue as possible, then pack with iodoform gauze; remove this on the third or fourth day and changing daily for about ten days; then leaving out the packing, putting cavity in bone and irrigations every four hours, followed by 95 per cent alcohol dropped in. The cavity was inspected daily, and the granulations kept down with a ring curette or silver nitrate, 50 per cent., —at times a zinc stearate powder was used after thoroughly cleansing the cavity.

One of the first places in which the skin was observed to cover the cavities was the internal wall in the region of the round window.

At times a good deal of difficulty was experienced in keeping down the granulations.

This series of cases represents ten consecutive cases which in my judgment needed a radical operation,—taken just as they came into the clinic, and not ten selected post-operative cases.

The results, so far as the hearing is concerned, are not so good in those cases where a cholesteatoma was found. The hearing is better where there is a discharge from tube, the sounds being conveyed to inner wall better than when dry.

I have in hospital records about 35 radical operations without a facial paralysis, injury to the labyrinth, or intracranial complication,—so that with care I feel the operation is a comparatively safe one.

These ten cases will hear a C fork 128, and some of them a C^{-1}, or 64, by air conduction.

In no one of the ten cases was the hearing any worse after the operation.

In all except two there was some improvement.

The Eustachian tube was thoroughly curetted in all of the cases, and there was a closure in some, though part remained open. Where the tube remains open the hearing has been a little better, but they may at any time get a discharge, due to a fresh tubal infection.

Cases having a radical mastoid operation should have the cavity inspected at least once in six weeks, since the cerumen may collect and become moist, causing an erosion of the skin, and possibly a secondary infection.

The hearing decreased with the increase of the granulations.

Conclusions.—These are drawn not only from the above ten cases, but from about twenty-five other post-operative cases as well.

1. The radical mastoid operation is not indicated in all cases of chronic aural suppuration.

2. It is indicated in a certain percentage of chronic infections, and no other surgical procedure will answer its purpose.

3. With the proper technique it is a comparatively safe operation.

4. The hearing in the average case,—not in all,—requiring a radical operation, should be improved.

5. The hearing,—allowing for the reduction due to removal of the drum, malleous and incus,—depends on the amount of fibrous tissue allowed to remain or form over the internal wall.

6. The after-treatment is most important, and its neglect will result in failure to obtain the desired results.

7. The hearing will be better where the tube remains open, the objection being that there may be a recurrence of the discharge at any time, due to a fresh tubal infection.

DISCUSSION.

DR. WHITING said that those who had had the opportunity to look at these cases presented by Dr. Smith must feel that he was entitled to congratulations in regard to the satisfactory outcome, and if the other 25 cases to which he referred presented as good results he had indeed reason to be proud of them.

Years ago, when we first began doing the radical mastoid operation, consideration was directed only to the arrest of the discharge, and little attention was paid to the hearing before or after the operation. The main idea was to arrest the suppuration. In a certain proportion of cases this was accomplished; in others, not. After being satisfied with these results for a certain length of time, it was found that occasionally a better result was obtained than was anticipated, and then we began to think and to consider whether we could not get a considerable series of such cases.

Dr. Smith had discussed the indications for the radical operation, and there was no criticism to be offered in regard to them. Dr. Whiting said that he was in perfect accord with all that Dr. Smith had stated. His description of the steps of the technique was very complete, and one could only emphasize the points to which attention had been directed.

There were five important stages in the operation: First, the opening of the aditus very thoroughly and the lowering of the facial ridge so as to make as wide an opening as possible between the superior and the posterior or inferior pillars of the aditus,—for if this is not done, one will be apt to leave a focus for granulations and will have a condition which will make it difficult or impossible to insure dermatization of the antrum.

The next step of importance is the thorough cleaning out of the epitympanum, the thorough removal of the auditory plate so that there may be no focus for the granulations,—and the same with the hypertympanum, and the clearing out of any cells which may run into the floor of the bony meatus.

Then, thorough attention must be given to the Eustachian tube, particularly with reference to the reaming out of the barrier. In addition to that, the careful destruction of the periosteum lining the tube. Dr. Whiting said that it had been his custom to put into the tube a cotton-tipped applicator dipped in a 1-500 bichloride solution, and to thoroughly remove whatever might remain of the periosteum as far as the isthmus.

The last step he desired to emphasize was the thorough curetting of the posterior margin of the tympanum and promontory, particularly in the situation of the pyramid between the foot plate and the stirrup and the facial ridge. The granulations are very apt to accumulate there unless one curettes very thoroughly and watches for them closely.

As regards the after treatment: If eternal vigilance is the price of liberty, eternal patience and perseverance is the price of good hearing in a radical operation. As Dr. Smith had said, if the operator turns the case over to an assistant he may expect, if not failure, a very modified degree of success.

Anyone who had examined these cases would have noted how free they were from any dense fibrous tissue.

Dr. Smith had said very little about using the graft. Evidently he did not use it as much as some do. Dr. Whiting said that he considers the use of the graft very important. It very materially shortens the period of after treatment, since it serves to discourage the growth of exuberant granulations and is the means of preventing the feature which Dr. Smith had emphasized,—the accumulation of granulations and bands

of organized tissue in the tympanum and over the promontory. Dr. Whiting said he had nothing new to say about the use of the graft. All those present knew as much about it as he; some approve of its use, others do not, but he believes in it. Even in case it does not take well it will form disseminated small nests of epidermis from which new epidermis spreads very rapidly and more effectively than can be secured by many applications of nitrate of silver, etc., or what not. One point about the application of the graft Dr. Whiting has found of great advantage. He had been accustomed to hold it in place with pledgets of cotton filled with one or another sort of powder, but later he found it to do better, after being in position, if held so by a wick of sterile gauze into the meshes of which borated vaseline has been thoroughly incorporated. When the graft is in position, he introduces a shallow cannula into the tympanic cavity, and through this he feeds the wick of gauze. It gradually accumulates until the entire tympanum is filled—the superior and inferior bony walls. Then a second wick is put in place, and held in the same way. In this way one is not apt to dislodge or displace the graft.

DR. RICHARDS expressed himself as thoroughly in accord with all that Dr. Whiting had said in commenting favorably on this series of cases There was very little to be said in criticism of the operation. It was an admirable series, and it would probably be prolonged, for in observing these cavities, one could see that certain features had been attended to which will guarantee continued success.

If one considers the radical cavity as made up of two parts separated by a vertical plane dropped transversely through the facial ridge, the trouble in nearly all cases of non-healing is found to be anterior to the plane mentioned; that is, to the part corresponding to the original tympanic cavity. The reason for this is that all operators succeed in removing the dead bone from that portion of the cavity corresponding to the main body of the mastoid; it is the anterior portion of the cavity which requires especial attention and which rests the operator's technique.

The first great step necessary for placing the radical cavity,—particularly the anterior portion of the cavity from which trouble most frequently comes, is the absolute lowering of the facial ridge down to the level of the facial nerve. This is the most frequently committed grave error, and while Dr. Smith has succeeded in securing excellent results in his series, Dr. Richards felt that in several of the cases the ridge could have been lowered to a greater degree with advantage. Again, the fringe of bone corresponding to the anterior face of the facial ridge, which is usually irregular and jagged, must be removed from before backward to the vertical limits of the facial nerve in order,—first, to secure, the maximum width to the apex of the cavity, and second, to expose to attack the cells of the posterior inner wall and those of the hyper-tympanum.

A very important step in the operation is to lower the floor of the bony auditory canal so that the floor of the hyper-tympanum and the floor of the canal are in the same plane. The hyper-tympanum is then

represented by no pit, and until its external wall is removed the hypertympanum itself is not accessible to attack.

A third step in the operation which is of extreme advantage is the shaving down of the convexity of the anterior wall of the bony auditory canal. This accomplishes several things: First, it widens the anteroposterior diameter of the apex of the cavity and prevents an epithelial septum from later pigeon-holing the apex from the main body of the cavity. This is an unfortunate and very common occurrence. This unfavorable condition is averted by carrying out the three steps just mentioned. A second advantage gained by removing the canal convexity is that we secure a splendid view of the region of the tube and therefore do not have to make an unnecessary large cartilaginous meatus to enable us to see the tube.

A fourth step, which every operator appreciates the necessity of, is the removal of the tip of bone overhanging the mouth of the tube. In addition to this, it has been his practice to evulse the tensor tympani muscle so as to enlarge the tube opening and permit a thorough view and curetting of it. It is surprising to what a depth, under these conditions, one can look into the tube.

One point that had impressed Dr. Richards in this series of cases presented by Dr. Smith was that the cavities were remarkably smooth, even so late after the operation. It is quite common, months after the operation,—to see irregularities of contour appearing, due to the protrusion of epithelial septae (out) into the cavity. They jut from any ridge-like irregularity of the bone. This could mean but one thing,—that is, that the bone cavities in these cases were rendered remarkably smooth at the time of operation. This is a very important point, because upon the smoothness of the cavity depends somewhat the thickness of the granulation bed which eventually lines it, and upon the thickness of the blanketing membrane, depends, to a great degree, the hearing.

Dr. Richards said that it had been his practice not to graft radical cavities until after a granulation layer had begun to spring up from the cavity. The portion of the cavity which he was particularly anxious to epidermitize early was the facial ridge and inner tympanic wall in the region of the windows.

This demonstration of Dr. Smith's illustrated what may be expected from the radical operation when properly done, in conserving the hearing, and Dr. Smith was to be congratulated upon the excellence of his results.

Dr. Dench said that he had been greatly interested in the cases shown. The results were certainly most gratifying, especially in regard to the hearing. As a matter of fact, he himself was one of the first to contend that the radical operation, instead of being a menace to the hearing, was in many instances, a conservative measure. In some cases where he has operated upon a double otitis, the hearing in the poorer ear was so much improved that the patient urged that the better ear be operated upon in the hope that the hearing would be still further improved. That is the best proof one could have that the radical operation, instead

of being a menace to the hearing, offers great promise of improvement. He has seen this demonstrated so many times that he has no hesitation in operating upon cases of double otitis, and in no instance has he been disappointed. Though the hearing is not always improved, yet one can accept the rule that he laid down at the International Otological Congress in Bordeaux in 1904 in regard to these conditions,—that we have three groups of cases to consider: First, those where the hearing was very good before operation; there, the hearing will probably be somewhat impaired. If the patient heard a low whisper before, he will probably not hear it quite so well afterwards. If he heard it before at 20 feet, he will probably not hear it so well afterward; if at 10 feet before, he will probably hear about the same or somewhat better; if at less than ten feet, he will probably hear much better after operation, unless the tuning fork shows some involvement of the perception mechanism. The case must be investigated to ascertain whether the lesion is confined entirely to the conducting mechanism. If this is the fact, there will be an improved hearing following the operation.

Dr. Dench said that he objected to one or two of Dr. Smith's statements. First, that the chronic suppurative cases with free drainage will be perfectly safe without operation. They are not safe. An attic that is not diseased is not always a safe condition. Very early in his practice he had a case that taught him that. The patient had a large kidney-shaped perforation; the inner wall was not thickened and it was not dermatized. When asked whether or not the case should be operated, he expressed the opinion that there was no danger of an intracranial condition and that operation was not demanded. A little later the man died of meningitis. The mere fact that there is a large perforation will not prevent infection from travelling up. Any purulent otitis is a dangerous condition. It is more dangerous, as Dr. Smith stated, when the vault of the tympanum is involved. A process in the lower part is more apt to drain, but it may easily extend upward to the vault.

Dr. Dench said he was glad to hear Dr. Richards refer to a point which he himself had hesitated to speak of. Dr. Smith had spoken of obliterating the post-tympanitis cells and completely lowering the facial ridge, but this had not been done in all cases presented. However, whether or not the ridge was lowered sufficiently, these patients did hear. So far as hearing was concerned, the results were magnificent and there was reason to be proud of them. Doubtless in future work Dr. Smith would take off the anterior portion of the ridge and more thoroughly expose the cavity.

In regard to grafting, Dr. Dench said that he had always been an advocate of the primary graft in middle ear suppuration, and he believes that if the procedure is properly carried out better results will be obtained than if the cavity is allowed to heal by the slow process. Dr. Smith had spoken of his cases getting well in eight to ten weeks, but Dr. Dench could not recall a case in his private practice where the suppuration had continued for that length of time. In fact, he had sent many patients home three weeks after a radical operation, and had sent a number home after two weeks.

Dr. Whiting had spokn of putting in two or three grafts in the tympanic cavity, but Dr. Dench said he could see no reason for that. As a matter of fact, he had cut a graft from a child three years of age and carried the skin out on the posterior surface of the mastoid, as he had described before the Otological Society three years ago,—so that one graft covered the entire radical cavity and the margin of the meatus. The great secret of the application of the graft was brought out by Ballance, who described the use of the pipette in removing the air under the graft. Make a graft that is intact throughout, apply it to the margin of the newly formed radical cavity and withdraw the air from beneath it with a pipette. It will go way down into the Eustachian tube and the entire cavity will be smoothly and evenly covered. It does not make any difference how it is held in position,—whether by aristol pledgets, a little gauze, etc.,—so long as it is kept in perfect approximation; but it is essential to get out all the air and to have all the surface smooth.

To do the radical operation successfully, one must go into healthy tissue throughout, and he had never been troubled by sequestra forming. If one is a careful operator he will do his last case better than his first. It is simply a question of going over the technique time and time again, until one is more nearly perfect.

Dr. Dench agreed with what had been said about clearing out the Eustachian tube so that you can see into it thoroughly, and then if you use the primary graft properly it goes right down and closes it; or you may take a little chip of bone and put it in to close the tube.

The appearance of granulation tissue during the period of convalescence depends upon what sort of cavity has been made. If you have a perfectly smooth cavity you will have very little granulation tissue. If you use escharotics you will have granulations. If you simply clean the cavity it will do better than if you keep on packing and using silver nitrate, etc. In very few cases, of late, has he used escharotics over the tympanic wall, and he employs very little curetting. If the facial ridge is lowered to the limit the anterior portion of the spur removed, and any granulation tissue removed that may be there and near the ossicles, there will be very few granulations. If this is scraped out the promontory stands out fairly clear. If the curette is run over the region lightly you will have the ideal thin membrane for covering.

Nothing had been said about the size of the meatus. That was a very important point. Dr. Dench said that he has operated upon a great many cases and in a very large proportion of them he has found that the cause of failure was that the external auditory meatus was not wide enough to ventilate the cavity. First, it depends upon the size of the cavity which is to be aerated, and then it depends upon the condition of that cavity at the time of operation. With a cavity that is fairly clean a smaller meatus is required than in a case with extensive disease of the bone.

Dr. J. M. Smith, referring first to the skin graft, said that he had not done a great many of these grafts, though he thoroughly approves of them. He does not, however, believe in employing them, when the dura is exposed, for he feels that there is a certain amount of danger to the patient from a standpoint of meningitis when skin is put into a cavity

that has dura exposed. In other cases it shortens the convalescence. A smooth, regular cavity is, of course, very important.

As to the criticism in regard to the facial ridge, this was perfectly justified. These cases could have had the ridge lowered a little more thoroughly than was done, but he was endeavoring to get good results and to have both sides of the face remain as nearly the same as possible.

In regard to the point made by Dr. Dench regarding cases of chronic suppuration with a large perforation, he had stated in his paper that these cases required careful study. Not all of these cases require operation, but all of the points must be carefully studied together before deciding that it is necessary to operate.

The mere presence of a discharge does not necessarily demand a radical operation. Some of these cases will get well without operation.

As to the Eustachian tube, Dr. Smith said that he had stated in the paper that he had endeavored to clean out all of the mucous membrane and granulations, also to remove the rim of bone in the outer wall.

Dr. Dench's point in regard to the size of the external auditory meatus was a good one. A good opening helps to produce a dry cavity, and there will be less trouble with a large opening. The flaps in these cases could have been larger and would doubtless have helped in the after treatment.

As Dr. Whiting had said, it requires a great deal of time and patience to prevent the formation of granulations in these cases. Therefore, it is wise to make a large cavity and remove as much bony tissue as is safe and desirable for a good clean cavity, as it is more likely to dermatize and dry up quickly.

Dr. Richards made a good point in saying that the time in which the healing is secured has much to do with the thickness of the membrane The longer the time the thicker will be the membrane.

The primary graft shortens the time of healing and is advisable when there is no exposure of dura.

Case of Leishmaniosis Mutilsus. MACHADO AND ALEIXO, *Brazil Medico*, Jan. 12, 1918.

A pimple first appeared behind the patient's left nostril. The lesion ulcerated with subsequent destruction of the cartilaginous part of the nasal septum, and hypertrophic infection of the palate, uvula, fauces and tonsils, tongue epiglottis and upper part of the larynx. The process was arrested by daily intravenous injections of antimony and subsequently some plastic work was successfully done. ED.

BACTERIOLOGY OF TONSIL CRYPTS.*

DR. OTIS H. MACLAY, Chicago.

So much work has been done on tonsil infections that the little mentioned in this paper will hardly be able to throw new light on such an interesting subject, but it adds a few more cases that have been carefully examined and gives a summary of the types of organisms present in the crypts of 536 tonsils or 268 cases.

The material examined consisted of tonsils removed during the past summer and fall and although the determining of seasonal infections is not our aim at this time, but will be taken up later, still in collecting the findings any decided difference between the organisms present in summer and fall is noted.

Many of the cases were those from the nose and throat clinic of Northwestern University Medical School, but a rather large number were private cases operated upon at Wesley Memorial Hospital. The clinical cases as usual showed a greater percentage of children with the ordinary history of repeated attacks of tonsillitis while the cases giving the history of systemic involvement; such as, brachial neuritis, nephritis, pathological conditions of the heart and rheumatic joints were, I believe, in adults in all cases.

Although having no definite bearing on this paper I might mention that the method of removal was such as to get, if possible, the tonsil with its capsule complete and that both general and local anesthesia was used. The tonsil removed was immediately placed in sterile gauze and not handled until taken to the laboratory, which was done shortly after operating, where with as little manipulation as possible the surface of the tonsil was cauterized and a sterile sharp knife used to cut cleanly into the crypts, laying them open. From these crypts smears and cultures were made. The smears being stained by various methods and immediately examined and the cultures grown for forty-eight hours at first, later twenty-four hour growths were tried, but from now on they will be kept for forty-eight hours, that length of time giving best results, and then examined both as to the macroscopic appearance of the colonies and the smears from them.

*Presented as a candidate's thesis to the American Laryngological, Rhinological and Otological Society, 1917.

Smears showing diplococci were stained for a capsule and also by Gram's and the morphological characteristics studied in order to differentiate the pneumococci. When our cultures, which were agar slants, showed streptococci, either pure or in mixed growths, we, in order to further differentiate the type of organism, transferred from the streptococci colonies some of the organisms to blood agar tubes, endeavoring by this means to show, if present, the streptococcus hemolyticus and viridans.

This applies to all of the work except that which was done during the month of June. After the first month of our work had passed we felt that we were losing considerable information by not determining as closely as possible the exact organism involved and so began to differentiate the streptococci by the blood agar cultures. In making smears from cultures one loop from each type of colony was separately examined, not only to confirm our diagnosis as to the type of organism in the colony, but also to prevent our overlooking any growth present.

The colonies were an interesting study in themselves, varying not only according to the organisms present but apparently the same organisms giving some differences in the sizes of their colonies in the different tubes. For instances, the very minute pin-point colonies of streptococci as well as the slightly larger ones of the pneumococci would in certain tubes be larger than in others even when they had been grown about the same length of time and on the same kind of media and media of the same making.

As already stated the smears from the tonsils are not from the surface but from the crypts. The surface smears show many different organisms but they represent merely the flora of the mouth and probably have no bearing on the specific pathology of any tonsil, i. e., we may find one or more of the surface organisms in the crypts and when so found they doubtless have a bearing on the tonsil infection present in that particular tonsil, but as to which of the surface organisms may be found in the crypts we cannot state from the surface smear.

The relation of smears and cultures shows decided variations in the cases studied. One type of organism may be found on a smear from the tonsil and in the culture a good growth of some other organism appear with only a few colonies of organism found on smear.

Example. Smear gave pneumococci but the culture gave almost pure staphylococci with only few pneumococci.

In almost all cases when no organisms were found on smears we obtained a number of luxuriant colonies. Sometimes pure cultures and at other times mixed. The staphylococci were most often found in pure cultures when the smear showed no organism with the streptococci in second place but occurring only about one-third as often and the pneumococci coming third. The staphylococci with and without the smear being positive was found fifty-three times in pure culture. The streptococci and pneumococci being next in frequency, each giving seventeen pure growths.

The number of times that no organisms were found on smears yet giving growths were many. In combination the streptococci and pneumococci and the streptococci, pneumococci and staphylococci were most commonly seen when the smears were negative.

The fact that a smear from a tonsil shows a negative field does not mean that the tonsil is not involved but merely that at the time of the tonsillectomy and, consequently, the time of smearing the organisms were present in few numbers due probably to the care which had been taken of the patient in order to have her in fit shape for operation, which preparation brought about a throat with a minimum of inflammatory reaction.

It was not uncommon to find free pus either at time of removal or when in laboratory tonsil was cut open with nothing seen on the smears from the pus or crypts but with cultures from the crypts showing organisms present.

Example: Smear from tonsil and pus negative. Culture giving pneumococci and streptococci.

In just four cases did the smears and cultures exactly correspond. All showed pure staphylococci.

The bacilli found were always stained for tubercle bacilli but only one was found. This case was one having pulmonary tuberculosis and tubercular glands of the neck. The patient was a young man of 21 years. This is especially interesting when compared with the observations of Mitchell as mentioned in the *Journal A. M. A.*, October 27, 1917. Under the heading of Primary Tuberculosis of the Tonsils the following appears:

"Mitchell,* however, has recently published some interesting observations from Edinburgh on primary tuberculosis of the faucial tonsils obtained from children with tuberculosis of the upper cervical lymph nodes, and from children with enlarged tonsils only and without evidence of tuberculosis of the servical glands or elsewhere. In the first group were 100 children and six adults. In no case was

it possible to establish the presence of tuberculosis prior to removal and examination of the tonsils. The tonsils were rarely painful, and there were no symptoms except swelling of the upper cervical nodes, which in about one-fourth of the cases was slight and in the rest rather extensive. On microscopic examination forty-one, or 38 per cent., of the tonsils were definitely tuberculous. Animal inoculation in ninety-two cases gave twenty positive results, the bovine type of bacillus being isolated in sixteen. There were 100 cases, all in children, in the second group with enlarged tonsils only. The cervical glands were palpable in all. Microscopically nine of these tonsils were tuberculous also, all nine giving positive results on inoculation. The type of organism in four was bovine, in two human, and in three undertermined."

The streptococci hemolyticus was found seventeen times but the streptococcus viridens only once. We believe this record due to an error in our technic, since with the slants of blood agar it was very difficult to determine their presence. Furthermore the viridens taking longer to show their characteristics may not have been grown long enough to be absolutely sure. Plates of blood agar will be used in the future.

Only two cases showed negative smears and cultures. Cases 73 and 93. Three others showed organisms in smears but gave negative cultures, making five (5) cases in all with negative cultures.

Only once were pure streptococci found on smear. During September and to October 17th, relatively, more streptococci were found than in the summer months, whereas the staphylococci during the same periods appeared to be about equal. More hemolytic organisms were recorded in the fall than in that of the summer months. Summer—three months gave two hemolytic streptococci. Fall—one and a half months gave fifteen hemolytic streptococci.

The following classifications show the number of times that the various organisms were found on the cultures and also the various combinations in which they were found and the number of times in such combinations.

*Mitchell, A. P., Primary Tuberculosis of the Faucial Tonsils in Children. Jour. Path. and Bacteriol., 1917, 21, 248.

ORGANISMS FOUND ON CULTURES AND NUMBER OF TIMES SO FOUND.

	Staphylococci	Pneumococci	Streptococci	Streptococcus Hemolyticus	Streptococcus Viridens	Diplococci	Bacilli	Hay Bacilli	Tubercle Bacilli
June July August	114	74	73	2	1	30	2	0	0
Sept. to Oct., 1917	52	47	60	15	0	19	3	2	1
	166	121	133	17	1	49	5	2	1

June, July, August cases.....144
Sept. to Oct., 1917, cases.....101
} 268—total number cases

COMBINATIONS AND NUMBER OF TIMES FOUND IN SUCH COMBINATIONS

	Staphylococci + Pneumococci	Streptococci + Pneumococci	Staphylococci + Streptococci + Diplococci	Staphylococci + Pneumococci + Streptococci	Staphylococci + Streptococci + Pneumococci + Bacilli	Staphylococci + Streptococci	Pneumococci + Streptococci + Bacilli
June July August	10	19	7	16	0	16	0
Sept. to Oct., 1917	11	16	8	14	2	8	3
	21	35	15	30	2	24	3

	Diplococci + Staphylococci	Diplococci + Streptococci	Streptococci + Bacilli	Hay Bacilli + Diplococci	Hay Bacilli + Streptococci	Pneumococci	Streptococci	Staphylococci	Diplococci
June July August	10	4	1	0	0	9	5	41	8
Sept. to Oct., 1917	6	1	1	1	1	8	12	12	3
	16	5	2	1	1	17	17	53	11

	Tubercle Bacilli	Negative
June, July, August	0	0
Sept. to Oct., 1917	1	5

Hay bacilli contaminated so much in two cases that we could not differentiate other organism.

Cases 99 and 104 showing hay bacilli are reported in table since showing other organism. Case 99, smear=diplococcus; culture=hay bacillus. Case 104, smear=negative; culture=hay+streptococcus.

In case number 232, sections were made but no culture recorded. In two cases, numbers 193 and 194, cultures not recorded, with smear showing no organism in case 193, but pneumococcus in case 194.

I wish to express my thanks to Dr. Wm. H. Holmes and Dr. Wm. T. Cluney of Wesley Memorial Hospital, for their aid and supervision in this work.

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Primary Tuberculosis of the Faucial Tonsils. A. P. MITCHELL, *Jour. Laryngol., Rhinol and Otol.*, Jan. and Feb., 1918.

1. Tuberculosis of the upper deep cervical glands develops from a primary focus in the faucial tonsils much more frequently than is generally supposed. 2. Primary tuberculosis of the faucial tonsils can be recognized only by the aid of the microscope and by inoculation experiments. The lesions are found under the surface epithelium and near the mouth of the lacunae or deep in the tonsil close to the capsule. 3. Hypertrophied faucial tonsils are the seat of primary tuberculosis, though rarely as compared with tonsils from cases of tuberculous cervical adenitis. 4. Bovine and human types of tubercle bacilli are present in the tonsillar crypts of a small percentage of children without demonstrable tuberculous lesions either in the tonsils or elsewhere. 6. Tonsillectomy is essential in all cases of tuberculous cervical adenitis in children. ED.

THE HYPOPHYSIS CEREBRI AND ITS MORPHOLOGICAL INFLUENCE.*

DR. F. PARK LEWIS, Buffalo, N. Y.

It is the purpose of this paper to point out a little glimmering light which may ultimately become an illuminating physiological and pathological fact. The demonstrations are not yet sufficiently clear to serve as a basis on which to predicate such a conclusion, but physiological experimentation and clinical observations both point so strongly to the principle about to be formulated that there can be no question whatever as to the desirability of extending the inquiries in order that the range of its application may be more fully understood and its limitations determined. It is this: *That the hypophysis cerebri when normally functioning, exercises a controlling influence not only over the skeletal and muscular structures but over the nutrition and development as well of all of the tissues having an epiblastic and mesoblastic origin.*

If this conclusion is correct, its bearings must have a far-reaching significance. It will then follow that the aberrations of function of the pituitary body will find their expression not only in frank manifestations of acromegaly, and in the less commonly recognized forms of dispituitarism which have been observed, but in a wide range of atrophies and distrophies which we have been obliged to relegate vaguely to congenital deficiences or other equally indefinite causes. It will also be found, indeed it is already known, that between the advanced forms of hyperpituitary activity manifesting itself in the young subject in gigantism and in dispituitarism in retarded development, both physical and mental, in those cases in which the secretion of the gland is modified or vitiated there is the entire gamut of possibilities in which vital physical disturbances occur without there being, of necessity, any discoverable alteration either in the organ itself or in the bony cavity in which it rests.

Let me briefly enumerate the recognized conditions which are present when the inhibitory control—whether it rests in the posterior portion of the gland, in the thyroid, in the parathyroids or elsewhere—is released, and the full force of this dominant organ is brought into play. They are not only skeletal changes, but the integument becomes thickened, the skin glands become more active, hair grows abnormally over the body, the sexual appetite may at first be increased and then lost, glycosuria, or polyuria, are present.

*Read before the American Academy of Ophthalmology and Oto-Laryngology, at Pittsburg, Pa., Oct. 29, 1917.

These are vital, fundamental physical changes that could come only through an effect produced on the embryological tissues from which they originate. There are no known drugs that can cause all of these results. There are no known diseases, except those originating in the endocranial glands that can so influence the primordial cells.

The pituitary body is the final development of one of the first, and doubtless most important of the embryological tissues of the notochord. It is a small organ about the size of a shelled hazel nut and weighs only a little more than half a gramme. The anterior, the glandular portion which dominates the growth of structures, grows from the invagination of the buccopharyngeal epithelium. The posterior portion is an extension of the infundibulum and comes from the mid-brain, from the floor of the third ventrical. Vestigia of the buccal ectoderma sometimes persist and are known as the pharyngeal hypophysis. In the dural lining of the sella neurogliar elements are found which are called parahypophysis. Both, it is thought, may, in the event of the major structures being destroyed, take on their functions. "Curiously enough," as Cushing observes, "the anterior lobe of buccal origin receives its vascular supply from a number of small arterioles which pass down the infundibular stalk, whereas the posterior, or infundibular lobe, is nourished by a single artery which enters from below and behind."

Now the effect of the active principle which has been obtained only from the pars posterior on plain muscle fibre is definite and specific. Like the extract of the suprarenals it produces a great rise of the blood pressure, with a contraction of the vessels and increase in force of the heart beats. "Moreover," according to Schafer, "while adernalin either produces no action on the coronary vessels, or in some cases causes them to dilate, the autocoid of the pituitary constricts them as it does most other systemic arterioles." It has furthermore been shown that the extracts of the posterior lobe also contain a substance which stimulates the flow of cerebro-spinal fluid.

The only analogy which we possess to these conditions is the effect produced on the chromosomes in the ovum by the addition of the ferment introduced by the sperm. In order that we may understand, even to the limited degree to which it is known, the normal and the perverted action of the hypophysis, we must know that of the other glands of the group; for rarely, if ever, is the function of one of them increased or suspended without the others being modified at the same time. As thyroid hypertrophy and overactivity produces the syndrome known as tachycardia exophthal-

mica, with proptosis and the other well recognized symptoms, so does a deficient secretion give rise to degenerative changes no less characteristic, while in the former the rapidity of the bodily metobolism is greatly increased, the heart action quickened, and the nutritive changes so hastened that there is a consequent loss of weight, perspiration is easily induced, and a tendency exists to the production of glycosuria. A thyroid insufficiency is shown by the opposite of each of these signs; the bodily temperature is reduced and is usually subnormal, the circulation is poor, the pulse rate reduced, there is greatly increased sugar tolerance, the skin is dry, rough, eczematous. With this comes obesity, an expressionless face, carious teeth, gingivitis, or actual pyorrhea. In children the sexual development is delayed,—immature sexual organs only being present in many cases,—the stature remains stunted, and there is a faulty mental development. The effect of an atrophy of the thyroid in young children is most marked. "The muscles are limp and weak. Deaf-mutism is common. The highest functions of the nervous system remain undeveloped, the child becoming idiotic. This seems to be due to an arrest of development of the cortex cerebri." (Schafer.)

All of this is important because on removal of the thyroid the pituitary undergoes enlargement and gives every indication of increased secretion. When the thyroid secretion is excessive there is an increased elimination of calcium from the body, and *per contra* with a thyroid deficiency there is a retention of these salts, resulting in atheromatous formations in the walls of the arteries and in calcareous degenerations elsewhere. As the activity of the thyroid decreases with advancing years it is not unlikely that the development of cataract may be hastened thereby. With these facts in view the statement first predicated may be carried a step further by saying:

That any interference, mechanical or otherwise, with the normal functioning of th hypophysis will exercise a controlling influence on the metabolism, the growth and development in the young subject, and on the nutrition and normality in the mature of all of the structures within the sphere of its activities.

We cannot, therefore, ignore in this connection the action of the other ductless glands. Gigantism is produced, not only by overaction of the pituitary, but, as Bramwell has shown, it is associated also with sexual development, and increased stature is a result of castration before puberty. With dispituitarism comes atrophy of the ovaries and testes so definitely that the relationship is incontestible. The diminutive stature of cretinism shows that the thyroids

and parathyroids have also an influence on elemental cellular structure, while in hypopituitarism the subnormal temperature, the slow pulse, the low blood pressure, the sluggish mentality give a clinical picture closely resembling the myxedema with thyroid insufficiency.

We have, then, in the series of ductless glands interacting ferments controlling cellular activities which are seemingly as potent as those which are developed in the elemental cell. There is no structure which escapes. With the enlargement of the bones of the face, with the modifications of the skin, and with the change in nerve structure, the fibrous tissues are at the same time involved. And when activity of any of these glands is disturbed, and the balance of function is lost resulting metamorphic changes may be expected, although they may manifest themselves only in the smallest degree. Morphogenetic substances and hormones act in very minute doses; they are substances which appear to act after the fashion of a nervous excitation or of a diastatic action; they bring no energy to the tissues or organs which they influence, but they only liberate pre-existing energy; they regulate anabolism and katabolism, construction and disintegration of the tissues.

It has already been shown that the action of the pituitary is to contract the arteries. The pathology of retinitis pigmentosa is that of a slow atrophic process with invasion by the pigment epithelium of the atrophic retina. In some cases the vessels are so reduced in size that they appear as white lines, and in others very dark lines can be discerned down the center of the pale path. Now when this is associated with those forms of physical development which would indicate an over-action of the anterior portion of the hypophysis, and a reduction of the action of the posterior portion, the condition which we would expect to find is thus described by Cobb. He says: "With one part of the gland functionating adequately, and the other deficient, the clinical picture might correspond to what is expected when the particular part of the gland is abnormal. Supposing the anterior part of the gland to be normal and the posterior deficient, we should expect a fully grown individual, but with excessive deposits of fat, slow circulation, sluggish mentality and the other features of hypopituitarism, with the exception of stunted skeletal development."

I have the good fortune of being able to present precisely such a picture in a lad twelve years old, who is five feet four inches in height. He weighs one hundred and twenty pounds. The clothes which he requires are those of a youth of eighteen years. He has a smooth skin, sexual organs quite undeveloped, he has a drooping

mouth, which is usually open, a slow pulse, a well developed sella with a pituitary apparently of normal size, a developing retinitis pigmentosa, markedly atrophic arteries, with the characteristic narrowing of the field.

And if the contention is correct, so forcefully urged by Jones, that the excessive or deficient action of the pituitary may modify the development of the eye structures, we should expect to find in advanced forms of hyperpituitarism changes in the nutrition of the globe. Unfortunately I do not find in a very large number of cases examined these changes have been noted. Even so careful an observer as Cushing merely notes in certain of his cases "that such a degree of visual acuity was secured when corrected," without mentioning the character of the correction employed.

It has been my good fortune to follow with very close attention a case of acromegaly since the year 1902. The characteristics are pathognomonic. The bitemporal hemianopsia follows an almost directly vertical line through the macula on one side and invading the macula on the other. When first observed there was an axial myopia of 10 diopters in each eye. This has progressively increased until it has reached 15 diopters but under glandular feeding all of the symptoms, except the limited field and the increased myopia, have been markedly relieved. The especial interest in this case is the length of time it has been unedr observation, the typical syndrome which it presents, the verification of hypophyseal hypertrophy by the Roentgenogram and the conclusion to which the demonstrable changes give warrant.

Miss M., who subsequently married, came under the observation of the writer in 1903. There was no suspicion at that time of there being anything other than the rather high degree of myopia, so that the general physical observations, which are not usually made by an ophthalmologist, were not recorded. There was nothing sufficiently characteristic in the facies to suggest the presence of the beginning of a serious organic disease, although a narrowing of the temporal fields was already present..

The patient who presented herself was rather a slight woman, 34 years of age, and about five feet six inches in height. Earlier pictures show very little of the coarseness of expression in the face which subsequently developed. She has light brown hair of moderately heavy texture, rather full, somewhat protuberant eyes, and a clear skin with a pink flush in the cheeks. She had worn glasses for the correction of her myopia since she was a little girl. At that

time she was having some discomfort in using her eyes, with an occasional sense of blurring. Her refraction under careful test was:

R—10 Dsph—50 Dcyl ax 150° v=20/30

L—10 Dsph—50 Dcyl ax 180° v=20/30

There was a choroidal atrophy around the disc with some pigmentary degenerative changes and a general fullness of the choroidal vessels without any marked staphyloma posticum.

Two years later, in 1905, the blurring was more frequent. Headaches had developed. The pain in the head began with scintillating motion on the temporal side; the pain usually being on the opposite side of the blurring eye. Vision was still 20/30 in each eye, with a slight change in the angle of the astigmatism, but as yet no increase in the myopia. About this time a change in the facial expression must have begun, although it was so gradual that no definite date can be fixed. The following year, 1906, still no refractive change, but vision had become reduced in the right eye to 20/40 and in the left to 20/30. No further changes in the eye ground.

In 1907 a slight increase in the myopia is recorded. Vision has been reduced to 20/30, with difficulty in each eye. The temporal fields are still narrowing. By 1911 the myopia has increased in each eye to 11.50 D. Vision reduced in the right to 20/40, in the left to 20/50.

The next year the bitemporal hemianopsia has markedly increased. In the left eye vision is 20/100. The macula has been invaded, only by looking to one side of an object can it be seen. At about this time an enlargement of the jaw is noticed. It begins to develop a prognathous form. She is conscious that the bite is different from formerly. The nose becomes broad and prominent, and a peculiar symptom develops, which may prove to be of importance in the subsequent study of this disease, and which the writer has not discovered in any of the observations connected with it. It is the opposite of the Stellwag sign in Morbus Basedowii. In place of the upper lid being retracted, showing a white scleral line and imperfectly following the eyeball in its downward excursion, the *lower lids droop showing a wide scleral line from below up.* There is still a proptosis, but not of a sufficiently marked character to attract notice, but the lower lids seem to sag down as though the nerve control were diminished. At about this period glandular feeding was begun. The face had assumed a somewhat myxodematous character and the treatment given was largely the substance of the thyroid, and the thymus gland of the corpus luteum. Once or twice the substance of the pituitary was given carefully and experimentally but with an aggravation of the symptoms.

By 1914 there was an increase of the myopia, also a distinct increase in the visual acuity. The refractive values were as follows:

R—13.00 D—1.50 Dcyl ax 105 v=20/30

L—14.00 D—1.50 Dcyl ax 75 v=20/30

The visual fields on each side were limited by the macula, marked staphyloma posticum, with a large crescent on the nasal side of each disc, but the headaches had wholly disappeared. The sense of blurring was also gone, and with definite bitemporal hemianopsia large objects could be discovered when moved through the obscured areas.

In March, 1917, fourteen years after the first observation, the subject, now a woman of 48 years of age, has a slight enlargement of the right lobe of the thyroid. Menstruation ceased at about the age of 37, but for a long time there was much irregularity in the menstrual functions. She has rather an excessive growth of hair on the face. All of the acromegalic symptoms, except that of height, are pronounced. The skin is clear, and at times she is subject to excessive perspiration which rolls off her face. Attacks of dizziness, to which she has been subject, have disappeared. Urinalysis shows nothing abnormal. Polyuria is present; sometimes she is obliged two or three times in the night to pass water. She likes sweets, but not excessively. Her digestion is good, her rheumatism is much better than formerly. Her fingers are square and chubbed. The field of vision taken on the tangent screen shows typical hemianopsia, almost directly vertical, reaching to the macula in the right eye and including the macula to the extent of 2 m. m. in the left.

From what has been written we might expect the symptoms produced by over-action of the anterior portion of the hypophysis might be corrected by the exhibition of the substance of the thyroid, and a sufficiently large number of cases are now on record in which enlargement of the restricted visual field, improvement in visual acuity and general physical betterment have been noted. Particularly striking are the cases reported by De Schweinitz (*Archives of Ophthalmology,* March, 1917). In addition to the substance of the thyroid that of the thymus has been of value. As hyperpituitarism causes a lengthening, a thickening, and a strengthening of the bones, *per contra* the hypofunction of the thymus renders the bones shorter, thinner and more fragile. As increased pituitarism is associated with, if not the direct cause of the atrophy of the testes and ovaries and the organism is deprived of the internal secretion of these glands, the employment of their substance in the absence of any

active principle obtained from them is especially justifiable. But the use of any of these materials cause at times profound effects and they should be used with judgment and caution. The initial dose should be small, and Cobb is undoubtedly correct in saying that these substances, especially that of the thyroid, are often given in doses that are too large.

In a paper presented before the New York Stomatological Society in 1902, and in another read before the American Society of Orthodontists in 1903, on the "Conformation of the Face in Relation to the Development of the Eye," the writer urged the importance of broadening the narrow jaw and removing lymphoid obstruction in the pharynx, in order that the lymph and nerve channels should be unimpeded, thereby preventing abnormalities in the area of distribution with the resultant atrophies, neuralgias and other trophic disturbances of the part involved. It was then urged that the marked benefit that follows adenectomies and the opening of obstructed nasal passages was not wholly dependent upon a freer admission of oxygen,—necessary as this is, because there may be occlusion of the nose, without any such group of symptoms as adenoids presents. The relief comes from the removal of the pressure on the nasopharyngeal vessels connecting with the hypophysis, the interference with the function of which causes an abnormal hebetude. Quite recently orthodontists are recognizing the importance of their work in this respect in the effect of the relaxation of constricted tissues upon physical growth.

There are two other ways at least in which the cavity of the endocrinal glands may be modified. The first is by excessive emotion,—and there are many such cases in which this is the exciting cause. The second has been urged by Mr. Lane in his work on the "Colon," and is toxic absorption.

Dr. Zentmeier, in his address before the Section on Ophthalmology of the American Medical Association in June last, found authority for ascribing to the disturbed action of the endocrinal glands hereditary optic nerve atrophy, optic atrophy with hyperthyroidism, an especial syndrome as described by Lamb, pigmentary degeneration of the retina as urged by Jones, retinal degenerative changes with osteitis deformans and amaurotic family idiocy.

Surely with such basic observations the subject is well worth the closest study until our knowledge of the relation of the ductless glands to organic eye changes is put on a more exact foundation.

THE MEDICAL PROFESSION AND THE DEAF.

LOUISE I. MORGENSTERN,* New York City.

Although a good deal has been published in the last few years on the great advantage of lip-reading for those who grow hard of hearing or deaf after school age, it is perhaps astonishing that so small a percentage only—about two people in a hundred—should take up the study. There are, of course, people who lack energy and ambition for any kind of a study, who could not be bribed to read a book or spend five consecutive minutes in meditation on any subject under the sun; but the percentage of these is surely not two in a hundred.

Many ear specialists do tell their incurably deaf patients that they *ought* to study lip-reading, in a manner, perhaps, as physicians are wont to advise their patients to "take a walk every day." In view of the invaluable aid that the art proves to those who cannot hear well, however, the advice is by far not emphatic enough. The average adult who has partially or wholly lost his hearing, as is well known, slinks into his own skin and becomes morbid and indifferent to what is going on around him. The lip-reading deaf person, on the other hand, looks around with interest and faces the world with an entirely different attitude. While the non-lip-reading deaf person bewails the loss of that which he did not hear, the lip-reader sums up with pride what he has been able to understand of a conversation. The one looks for trouble and usually gets it, while the other is happy in the thought of having gained a victory over difficult conditions. I have observed this optimistic frame of mind of the lip-reader in comparison with the morbid mentality of the non-lip-reader on many occasions. What is there, I wonder, in lip-reading to bring about this favorable change in the mental and consequently also physical life of the deaf adult? What is there in this art, that at the best is only a substitute for the lost sense of hearing, to make deafness so much more easily to bear and to work the transformation in the life of those who were reasonable enough to give it a trial? It remains perhaps for a psychologist to discover, but what we who have knowledge of these

*Principal of the Manhattan School for the Hard of Hearing and author of "Lip-Reading for Class Instruction," etc.

facts and conditions can do is to bring under the enlivening influence of this study as many of the despondent hard of hearing and deaf as are not beyond the reach of logic and the listening to sound advice.

Some would-be students who were but partially deaf observed to me that the study would make them feel like a defective; others claimed that they were not deaf enough to need it. These remarks show a great lack of understanding of what lip-reading is and must, of course, be ascribed to the hypersensitiveness of the average deaf adult.

The word "lip-reading" is perhaps not the best name for the study. What it implies, however, is that the eyes have been trained to recognize rapidly the externally visible movement of the speech organs, which appear as an aggregate in word and sentence pictures; and that the mind has been trained to interpret these movements and to construct the word and sentence pictures into spoken language, whereby several mental processes are involved. The first and most important step is to make the student concentrate, think, and listen. Many of them who have fallen victims to the listless habits of the deaf find this irksome at first; it is often difficult to hold their attention. Gradually they learn to concentrate on the work in hand, to think rapidly of the various meaning of words as they appear in sentences, and to listen with sustained effort to whatever the theme may be. It is frequently also necessary to develop the learner's synthetic qualities, and to train his mind along other required lines of thought. Thus the study becomes of inestimable value, not only in learning to understand what cannot be heard, but also in reconstructing his entire mental life and habits.

It is of the greatest importance, I believe, that the partially deaf adult should begin the study of lip-reading before his defect in hearing has become noticeable, even if he still be under treatment by an otologist. The relief that the eyes give to the weakened ears, which suffer under the constant strain of listening, is too obvious to require special mention or explanation.

The idea that it takes years to acquire skill in reading the lips is today disproven by the great advances that have been made in recent times in the teaching of this art. Usually from three to six months, in exceptional cases a year, according to ability and temperament of the student, are required to develop skill. It is surprising what a large percentage of deaf people have a natural ability for this "hearing" by sight. Not knowing of this latent

power, however, or unwilling to make use of it, they make life utter misery for themselves and those about them. They expect every word that is said in their presence shouted into ears, while their eyes are turned away from the speaker. The otologist's first advice to such a patient therefore should be: "Use your eyes!"

Why still this conservatism on part of so many otologists who do not give lip-reading its due valuation and sometimes, fearing to discourage a patient, hesitate to impress him sufficiently with its great importance? What disadvantage could possibly ever arise from a knowledge of this art?

I would like to see a totally, or for that matter, a partially deaf person who cannot read the lips, travel, as a deaf friend of mine has done, on foot from Missouri to the deserts of New Mexico, gathering news and facts on the way and contributing them to newspapers and magazines. Or travel for three months alone in Europe, as I have done, understanding several languages of the continent by sight, and enjoying the experience. Or holding a responsible position in a large banking house, as another deaf lip-reader of my acquaintance does. I have knowledge of a large number of women who had to give up their original calling on account of encroaching deafness, who have become trained teachers of lip-reading and are today successfully filling their places in their community. I know, besides of boys and girls who lip-read their way through high school or college, often at the head of their class.

The adult deaf, moreover, who in former years when unable to read the lips could not be bribed to associate with one another, are now organizing in many of the larger cities of the United States in order to assist one another, to provide social life, and to offer opportunities for studying lip-reading. It all points to a general awakening of the deaf who in the past were misunderstood and often misjudged. The future may bring a better understanding for their complex problems on part of the great mass of people who today do not care to be "bothered" with one who is deaf. The study of lip-reading, I am convinced, is bound to play a most important role in this reconstruction of the deaf, until the time may have arrived when the medical profession will have discovered an absolute cure for deafness, or when deafness shall have vanished forever from the face of the earth.

7 East 42d St.

A NEW EAR TEST FOR MALINGERING.*

FREDERICK F. TEAL, Lincoln, Nebraska.

In examining men who were included in the draft, I have encountered some difficulty in uncovering the dishonesty of "slackers" who claim to be deaf in one ear; the Weber and Rinne tests are of great help, but even with these it is at times difficult to be certain that a recruit is, or is not deaf in one ear.

For these instances I have used the following reliable test which, in the absence of any record of it as far as I am able to determine, I believe is original with me. The test is of service in unilateral catarrhal deafness only, but as this comprises the greater class of ear malingerers it is exceedingly useful.

The person is blindfolded and in a friendly, helpful manner, told that if he is really deaf there is no disposition on our part to overlook it. But he is also warned that if he tries to show dishonesty in the test, he is sure to be "tripped up" and his veracity doubted.

Air conduction is tested and of course is negative. The Weber test is then used and usually (though reluctantly) he hears the fork in the deaf ear. Bone conduction over the mastoid is next tested and again he admits hearing the fork. He is then commended for his answers and assured that he answered as he should.

The last and real test is now used. After saying you want to try the last test (bone conduction) once more, a non-vibrating fork (or lead pencil, flat end) is placed over the mastoid to make him think he is being tested in the same manner, but at the same time a vibrating fork is brought up close to the auricle with the other hand to test the air conduction. If he is simulating deafness he will of course answer that he hears the fork (under the impression that he hears the sound through the bone) and the fact of a normal path of air conduction is established. If he is really deaf, he will of course not hear the vibrating fork.

I use for this test a Hartman's "C" fork.

207 Richards Block.

*Presented before the American Academy of Opthalmology and Oto-Laryngology, at Pittsburg, Oct. 30, 1917.

TECHNIC OF PERINEURAL ANESTHESIA FOR RADICAL SURGERY OF THE MAXILLARY SINUS.

DR. LAWRENCE GATEWOOD, New York City.

Anatomical Considerations.—The infra-orbital and posterior superior dental nerves, branches of the maxillary, are the nerves supplying this region. A study of their location and distribution will convince the reader that it is quite possible to completely anesthetize this region by injecting a local anesthetic into the vicinity of the trunks of these nerves.

The maxillary nerve passes through the infra-orbital sulcus and canal to the infra-orbital region of the facial surface of the maxilla, giving off numerous branches in its course. In passing through the infra-orbital canal it gives off the superior dental branches at various intervals through the minute canals in the body of the maxilla. The middle and anterior superior dental branches are given off near this point and supply the alveolar process, sending off small twigs to the teeth.

Before entering the canal the maxillary nerve gives off the posterior superior dental nerves to the maxillary tuberosity which partly follow the arteries, partly pass through their own foramina into the tuberosity and the body of the maxilla. Following the arteries they pass forward above the molar teeth, branching out within the facial wall of the maxilla and finally communicate with the middle and anterior superior dental nerves. They supply the oral mucosa, the molar teeth, the mucus membrane which lines the maxillary sinus and the periosteum.

The infra-orbital nerve frequently divides into from two to four branches, which arise closely together from the infra-orbital foramen. They run from behind and above to forward and inward. Their numerous subdivisions form a thick nerve plexus, which in turn sends off finer branches to the oral mucosa, the floor and the lower lateral aspect of the nasal cavity and the incisor and canine teeth.

From the above description of the nerve distribution it is clearly seen that anesthesia of this region may be easily brought about by the injection of a local anesthetic into the vicinity of the infra-orbital and posterior superior dental nerve trunks. This solution, penetrating by way of the perineurium into the central nerve substance, inhibits its function and anesthetizes the peripheral area supplied by these nerves. Owing to the elimination of the conductivity of these nerve trunks, sensory irritations of their terminal filaments are no longer perceived in the central organ and the anesthesia is complete.

The technic for blocking these nerves is as follows: To inject the infra-orbital nerve, the infra-orbital canal is palpated with the index finger, this being located two-fifths of an inch below the middle of the infra-orbital ridge; the finger is kept on this point. With the thumb of the same hand the lip and cheek is drawn up to expose the field of operation. The needle is inserted into the buccal fold slightly distal to the apex of the canine teeth, care being exercised to avoid penetrating the alveolar process. The needle is now passed upward and slightly inward for three-fifths of an inch, infiltrating the tissues slowly as the needle is advanced. Having inserted the needle to the distance above stated, we are now in the region of the infra-orbital canal of the facial surface of the maxilla. Here the remainder of the anesthetic solution is deposited, this being felt by the index finger. Gentle massage of this area will hasten the absorption of the anesthetic, producing proper anesthesia of this nerve and its branches.

Technic for injecting the posterior superior dental nerve: This injection is guided by the condyle of the palate process of the maxilla. The point of insertion of the needle is in the buccal fold corresponding to the middle of the disto-bucal root of the second last tooth from the condyle, this being the first or second molar respectively, depending upon the presence or absence of the wisdom tooth. The needle is now passed upward, backward and slightly inward, passing over the apices of the buccal roots of the second or third molar, as the case may be, using an angle of about forty-five degrees to the acclusal plane of the teeth. The tissues are infiltrated slowly as the needle is pushed forward and the remainder of the anesthetic solution is deposited after the needle has disappeared for about four-fifths of an inch.

The advantages of conductive anesthesia over the infiltration method are:

(1) Less anesthetic is required.
(2) Anesthesia is produced with less pain.
(3) The duration of the anesthesia is greater.
(4) Less trauma is produced and the danger of infection is not so great.

Novocain is the anesthetic of choice in this field of work, two (2) c. c. of a 2% solution of novocain being used in each of the above injections. The average reader will consider this solution to be of unusually high strength, but when we take into account the very small quantity of this solution necessary to produce anesthesia after the above described method, he will be convinced that a toxic effect is much less likely to occur than when a weaker solution is administered by the infiltration method.

15 East 48th St.

Operative Treatment of the Accessory Sinuses of the Nose.

F. E. V. SHORE, *Jour. Iowa State Med. Soc.*, March, 1918.

In the majority of cases of ethmoiditis there is some involvement of the sphenoid sinus and the enlargement of its ostium adds but little to the dangers of the case and usually affords much relief to the patient and the avoidance of a secondary operation at a later date. It is usually not necessary to remove the entire anterior wall of the sphenoid as the enlargement of the opening permits sufficient drainage and avoids the dangers of hemorrhage and infection which occasionally occur when the entire sinus wall has been removed. In acute infections of the antrum, where drainage fails to take place through the ostium, a needle puncture directed backward and upward about the center of the lower surface of the turbinate, with lavage and negative pressure usually suffice to effect a cure. Should it fail or the case be chronic the radical intranasal operation or the combined canine operation should be selected. The Canfield intranasal operation has proven very satisfactory in the author's experience and is of much less magnitude than the Denker, is more easily performed and preserves the normal function of the nose, permits free inspection of all parts of the cavity and easy access for the removal of polyps and necrosed areas. ED.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION OF LARYNGOLOGY AND RHINOLOGY.

Meeting of Feb. 28, 1918.

A Recent Laryngectomy, Patient and Specimen. DR. HUBERT ARROWSMITH.

This patient, a man aged 40, was referred to Dr. Arrowsmith by Dr. Talbot M. Chambers on December 19, 1917, with the history that during the past year he had had gradually increasing difficulty in breathing, with considerable hoarseness. Indirect laryngoscopy showed a mass on the left ventricular band and another below the glottis, but, as revealed when the larynx was laid open, no appreciation of the vertical extent of the growth could be had by direct and indirect examination. There was a rather indefinite luetic history and a positive Wassermann. A specimen was removed for microscopical examination, and the pathologist reported that it was neither tuberculous nor malignant. It was assumed to be luetic and Dr. Chambers medicated him thoroughly, but without effect.

On January 9th, the patient returned with marked increase of his dyspnea and it was deemed advisable to do a tracheotomy. Another specimen was removed, which was pronounced typical epithelioma.

The advisability of a laryngectomy was explained to him, which was done by Dr. Arrowsmith on January 30th, with the assistance of Drs. Chambers and MacKenty; Dr. MacKenty's technique being followed in detail minutely. The patient made a very speedy and gratifying recovery.

He was fed intensively through a permanent nasal tube for ten days. That is a point on which Dr. MacKenty lays the greatest stress. Rectal alimentation is a delusion as far as the nutrition of the patient is concerned. The feeding tube was removed in ten days as stated, and in two weeks the patient was eating everything he wished, solids included. His highest rectal temperature was 100.5°.

Dr. Arrowsmith said that this was the first time that he had been able to get Dr. MacKenty to concede that there were some advantages in oil-ether colonic anesthesia, bue he had to acknowledge that the anesthesia was ideal and that the bleeding was much less than he had been accustomed to. Post-operative tracheal suction was unnecessary and only once was the cough troublesome enough to require attention. Now, in precisely four weeks, the wound is entirely healed with the exception of a very small sinus at the upper angle. There is every reason to hope for a complete cure in this case, as the neoplasm was entirely removed. Vocally, of course, very little can be expected.

In the same connection, Dr. Arrowsmith presented a larynx removed from a patient at Kings County Hospital in December, 1917. Dr. MacKenty also was kind enough to assist him on this occasion. This man,

aged 56, gave a history dating back about a year. Extreme dyspnea necessitated a hurried tracheotomy two weeks before the laryngectomy was done and in that two weeks, as the specimen shows, the larynx had become entirely occluded, there being practically no airway at all. This was not a favorable case for operation, as the esophagus was involved; it was necessary to remove nearly two inches of it, with the exception of a half-inch wide vertical strip of the posterior wall, left with the purpose of doing some plastic work later on. In this case oil-ether colonic anesthesia was also used, and no subsequent tracheal suction was necessary.

The operative recovery was satisfactory, but the patient died in the seventh week from a typical lobar pneumonia.

Dr. Arrowsmith emphasized as vital essentials in these operations the intensive feeding, only to be attained in the way described, and the rectal administration of the anesthetic by Gwathmey's method.

DISCUSSION.

DR. MACKENTY said that it was very difficult to determine the vertical extent of a growth by any method of oral examination, and one is often surprised on opening a larynx to find the great extent of these conditions. These two ocular demonstrations of the value of rectal anesthesia were very gratifying to him, but had not changed his views concerning the dangers attending it, for there have been more deaths credital to it than to any other type of anesthesia. In this particular class of cases, however, it seems to have many advantages; it undoubtedly diminishes the bleeding. Dr. Arrowsmith's technique was very clever. The operation was done quickly and he had the smallest opening into the pharynx that Dr. MacKenty had ever seen in this operation. That certainly had something to do with the prompt healing; the patient also probably had a clean mouth.

Dr. MacKenty said that he absolutely agreed with Dr. McCoy that a sterile mouth is essential to a quick recovery.

Although a preliminary tracheotomy was performed, he did not believe that had anything to do with the recovery. The old tracheotomy wound was removed, making the operation the same as if it had been done without tracheotomy. He did not agree with the other men that a preliminary tracheotomy is necessary in these cases. It was a privilege to assist in these operations, and Dr. Arrowsmith was to be congratulated on the results. It was fortunate that the first patient died, for he had an extensive cancer and recurrence would certainly have happened. In the other case there was reason to hope for permanent cure. It did not seem that the disease had reached a point where there was excessive danger of involvement of the glands of the neck. Some operators, such as Marschik, remove the glands of the neck in almost all cases. This, however, adds greatly to the mortality and does not seem justifiable in all cases.

DR. MCCOY said that it was a most interesting case and a very splendid result. It was gratifying to hear that Dr. MacKenty was pleased with the rectal anesthesia, for it was certainly an ideal method in these cases. Dr. McCoy stated that he had not heard Dr. Arrowsmith say

anything about the glands or whether they were looked after. As the growth seemed to be extrinsic it followed that it was in a location where there would very probably be glandular involvement and, of course, if any malignant tissue remained in the neck there would probably be a recurrence.

Neither did Dr. Arrowsmith say anything about the condition of the patient's mouth. It must have been in very good condition to present such a good result, and such quick healing. The absolute sterilization of the mouth, preliminary tracheotomy and rectal anesthesia are the essential requirements for such a success, and Dr. Arrowsmith and Dr. MacKenty were to be congratulated on this case.

Dr. Guntzer remarked that the patient seemed comparatively young, and asked if that might not have had something to do with the smooth recovery.

Dr. Kernan said that, according to his understanding, the younger the patient the more likely was the recurrence of the carcinoma, and asked what had been the experience of Dr. Arrowsmith and Dr. MacKenty in that respect.

Dr. Chambers said that he had had the privilege of assisting in the operation, and that no glands were found, although they were sought. When he sent the patient to Dr. Arrowsmith he would have been willing to bet anything that there was no growth below the vocal cord, and Dr. Arrowsmith at first thought that it was limited to the region of the cord. It was only at the second examination that he began to suspect that there might be something below. When the growth was removed it was found to extend below the third cartilage. There was one point that perhaps might answer one of the questions that had been asked. At the time of the operation it was asked why there was such a beautiful quiet sleep; the man was quiet and the operation was clean. The answer to that was that the anesthesia had been administered very slowly, taking fifteen minutes to put it into the rectum.

Dr. McCoy said that he thought a point had been overlooked in regard to preliminary tracheotomy. It was unnecessary in such cases as had been presented, but if there should be an infection in the neck wound the patient would be insured against having the infection travel to the mediastinum, etc. The histories of the cases in former years where this operation was done show that many died of infection getting into the mediastinum.

Dr. MacKenty said that he had had cases of the worst infections possible following laryngectomy, but in none of them was there any mediastinal involvement. The method of drainage which he employs consists in placing a drain behind the tracheal stump; this is brought out through punctures in the skin. The drain crosses behind the tracheal stump, draining through the two punctures. In no case that he saw abroad did they use the two-stage method. He had seen Marschik do 13 laryngectomies and in none of them was there any mediastinal involvement, though some of them broke down and were very much infected. The treatment of the infected cases requires constant attention to guard against the pocketing of pus. Here one must discard all ideas of securing a union which will close off the pharynx and devote all his

energies to thorough and open drainage. The plastic which must follow in some of these cases is sure of success if sufficient time is given the tissues to recover from the infection before attempting a closure.

Dr. Arrowsmith said that the contention of the chairman as to the lack of necessity for a preliminary tracheotomy had been proven by his —the chairman's—successes. If a tracheotomy had already been done the tracheotomic wound must be excised and the trachea loosened from all its attachments, in order to coaptate it satisfactorily with the skin. Unless required for the relief of dyspnea, it adds nothing to the patient's safety.

If Dr. McCoy would examine the specimen again he would see that the growth is entirely intrinsic.

Radical Frontal Sinus Operation with Technique to Prevent Deformity.
Presented by DR. GEORGE E. DAVIS.

DISCUSSION.

DR. MACKENTY said that the case of a frontal sinus suppurating and healing with the blood clot as described by Dr. Davis presented some interesting phenomena quite foreign to our forced ideas of the action of blood clot in a septic field.

DR. TALBOT CHAMBERS asked how Dr. Davis got the blood clot twenty-fours hours after operation. Did he irritate the wound and make it bleed?

DR. DAVIS said he was glad Dr. Chambers had asked that question. There was really a primary blood clot following the packing. There was a big post-orbital abscess, with much necrotic tissue, and he was afraid to attempt a primary blood clot on account of the danger of infection, etc. At the time it was his idea to pack with gauze and prevent infection by the use of the iodoform disinfectant. The gauze was put in as a continuous single strip, and when it was removed the pulling it out loosened it from the tissue and thus furnished the blood. One strand drawn taught was not removed but was left in to block and retain the blood and that was removed twenty-fours hours later. By having the patient recline on the opposite side there was enough swelling of the tissue to retain the blood until there was coagulation. The outer or skin wound was healed on the fourth day, with no discharge whatever. There was a slight intranasal secretion for two or three weeks, which only required an oil dressing. The patient was out of the hospital in a week.

Carcinoma of Tonsil: Radical Removal. Adenoma of Superior Maxilla.
DR. JOHN MCCOY.

Case 1.—This case was first seen at the New York Eye and Ear Infirmary in the early part of November, 1918. The patient was a man 57 years of age, a cigar-maker by occupation, who stated that for some time he had felt a soft lump on the left side of the throat, inside the mouth. There was no pain but he was conscious of it on swallowing. He had smoked and chewed a great deal for the last forty years. A Wasserman test was negative.

On looking into the throat a growth could be seen standing out from the tonsil and apparently extending half way across the throat. A section was removed and the pathologist reported it to be a basal celled carcinoma. At the same time one could distinctly feel three enlarged glands in the side of the neck, apparently in direct connection with the throat.

It was decided to remove the growth and on December 6th, an incision was made through the neck inward. The method of procedure was to make the incision along the side of the sterno-mastoid and then to enter the carotid sheath, separate the external and internal carotids, and tie off the external carotid artery; then to dissect through the neck exposing the hypo-glossal nerve the posterior belly of the digastric, the stylo-hyoid and stylo-glossus muscles down to the superior constrictor. At that point the growth in the mouth was seized and pushed into the wound in the neck. The superior constrictor was slit and the tonsil and growth pushed out into the wound. It was a comparatively easy procedure. The tonsil was dissected entirely out through the neck wound, also parts of the posterior and anterior pillars which were infiltrated. After removing the growth the sterno-mastoid was laid back and the three large glands were exposed, each about the size of the top of a thumb. These were dissected out and the wound closed except for an opening at the lower end. Dr. McCoy said that if he were doing the operation again, however, he would let the wound heal by the open method, so as to allow of radition in the wound.

Within a few days radium was applied to the wound inside, passing it through a glass tube and applying the radium directly to the wound for an hour and a half on three successive occasions, a week elapsing between the treatments, with the result that apparently the man has made a perfect recovery. No glands can be felt and the man seems to be in perfect health. The glandular chain was searched very thoroughly at the time of operation and every particle of suspicious looking gland removed, and there was every reason for hoping that there would be no recurrence.

Case II.—This patient, Fannie J., was fifty years of age, a native of Germany, and was first seen November 16, 1917. At that time she had a swelling on the left side of the face, which she stated had steadily grown for a year. Examination showed it to be a tumor filling the left cheek and left nostril, and the left vestibule of the nostril. A specimen was removed and examined by three pathologists, all of whom agreed that it was a non-malignant growth, an adenoma, and one suggested that it was originally a dentigerous cyst from which had sprung the adenomatous growth. There were no glands in the neck. The operation required was the complete removal of the tumor, through an incision along the gum and cheek margin; it had eroded a hole in the septum of the nose.

On December 13, 1917, an incision was made from the middle of the cheek and gum margin, extending back to posti border lips maxilla, and upon reaching the tumor it was found to be an encapsulated growth. It had eroded the bone between the vestibule of the nose and the mouth, and had pushed its way in; it was about the size of a fist and had prac-

tically grown to the posterior nares. Every vestige of growth was removed and the patient made a good recovery.

At the time of operation the face was enlarged out about an inch over the cheek, now the face was perfectly normal.

Dr. McCoy said it was the first case he had seen of adenoma of the superior maxilla, yet two weeks ago he had another.

Frontal Sinus Case. Presented by DR. MCCOY.

Case III.—This patient showed an extremely interesting condition. He was first seen November 8, 1917, at which time he said his eye had been slightly swollen for about a year. In July a local specialist operated on the ethmoids and the middle turbinate was removed. This however did not relieve the condition of the eye. Finally he consulted an eye specialist, for he thought he was going blind. He could not recognize individuals, and could not count fingers a foot away from the eye. The eye specialist referred the man to Dr. McCoy.

When first seen the eye was protruding slightly outward and forward. Examination of the nose showed a small amount of pus, but apparently nothing very serious. An X-ray examination, however, showed that the frontal sinus was filled with pus. It was opened externally, and a very large frontal sinus was revealed, containing about an ounce of pus under pressure. It had broken through the orbit and had eroded the posterior plate of the frontal sinus, so that when it was opened the pus welled out with the pulsation of the brain.

The wound was closed, leaving an extra large opening inside, so as to provide adequate drainage. The day after the operation the patient was able to count fingers three feet from the eye and could recognize persons whom he knew. The wound healed in ten days, and there was absolutely not a drop of secretion.

It was a rather unusual case, for the man had been under the observation of a nose and throat man for six months, yet the condition was not recognized.

DISCUSSION.

DR. JOHN D. KERNAN said that Dr. McCoy had presented the case of carcinoma of the tonsil in a very modest way and had minimized the difficulties of the operation. He himself had had a similar case a couple of years ago and the operation impressed him as being an extremely difficult one. Dr. Kernan said he thought much of Dr. McCoy's success was due to the ligating of the external carotid. In his own case he had not ligated the carotid. There was no difficulty in getting down to the pharynx, but when the attempt was made to get into the peritonsillar tissue there was a great deal of hemorrhage. Dr. McCoy had suggested that if he were to do another sim ilar operation he would leave the wound wide open. That was a very important point. In the case which he had operated, although the carcinomatous tonsil was removed and the patient left the table and made an operative recovery, he died on the tenth day from sepsis. The wound had been closed, as in Dr. McCoy's case, and became septic, and although an effort was made to open it afterwards, it was too late. Also the patient was a man of seventy, and had less resistance than a younger man.

DR. MACKENTY concurred with Dr. Kernan in thinking that Dr. McCoy was over modest in stating that the operation was easy, for it was not an easy piece of work. It was very gratifying to see the throat men taking up this difficult surgery of the neck. He had claimed for years that there are throat men in this city who are capable of doing better neck surgery than the general surgeon can do, as their technique is finer. It was very interesting and encouraging to have such cases presented before the section. All agree now that it is important in opening the pharynx to secure good drainage, and the more experience one has the less the inclination to sew up the wound. In cases of carcinoma of the tonsil it is almost certain that the neck glands are involved early. The fact that they are not palpable does not mean that they are not involved, and in operating it is better to do a block dissection of the neck and remove the glands thoroughly with the sternomastoid muscle Dr. MacKenty said that he was not sanguine as to the results in these cases, for he had never had a patient make a permanent recovery; all had had recurrences and died of cancer. They are practically doomed from the start.

DR. MCCOY said that of course the operation was very much easier when the carotid was ligated, for working through the neck and subject to all the hemorrhage from a pulsating carotid makes the operation more difficult. Once it is tied off the operation is practically bloodless and the dissection is comparatively easy, since the landmarks can be recognized. It was the only correct way to do it, for one cannot tell how much infiltration there will be from the outer pole of the tonsil. It is easy to lay back the sterno-mastoid and remove the glands. The reason why he thought it best to leave the wound open was not so much on account of sepsis as to make it possible to observe the wound internally as well as externally, in case some infected material might have escaped attention. One can never tell that some cancerous cells may not have been left in the neck. The latest method of operating on sarcoma of the tonsil, for instance, is to do a dissection through the neck and follow up the blood vessels to their minute terminals as closely as possible, remove the glands,—for it is admitted that cancer cells lie around the blood vessels,—and having dissected them out as thoroughly as possible, to apply radium to kill off any cancer cells that may remain; if you close the wound, you close the chance of using radium, which is a valuable aid at that stage of the procedure.

Plastic Operation on the Nose. Presented by DR. L. M. HURD.

The patient was a man fifty-five years of age, who had been assaulted and robbed. He was hit across the head and became unconscious, and his nose was cut off as a piece of spite-work. He was in the hospital for some time before he recovered, and was discharged with all the soft tissues gone. He came to the University and Bellevue Clinic with plaster on his face, and unable to work on account of deformity. It was decided that the easiest way to give him a nose would be to make a flap from the forehead, taking enough tissue to reach to the hairline, turning it on the pedicle and sew it in place, at the end of ten days cutting the

pedicle and bringing it back on the forehead. There was a little suppuration where the flap was attached to upper lip from muscular tension of the lip, and a secondary stitch had to be put in.

The man has a very good nose, though not one suitable for a person of a better class or for a woman, but in this instance it seemed to be the better and quicker method. It took only two weeks for the work, and the man has good breathing and a fairly presentable nose.

DR. GUNTZER asked if in making the flap Dr. Hurd did not find that it shrunk to a certain extent.

DR. HURD replied that such a possibility was considered and the flap was made fifty per cent larger than required.

DR. GUNTZER then asked about the absorption of the pedicle, and Dr. Hurd replied that part of it was put back, as there would be no absorption.

PHILADELPHIA LARYNGOLOGICAL SOCIETY.

Meeting, Wednesday, March 6, 1918.

SYMPOSIUM ON DIPHTHERIA.

Dr. John A. Kolmer, in reviewing the bacteriology, immunology and serology of diphtheria, stated that the most important consideration at the present time, brought about by the present war, was the diphtheria carrier.

Bacteriologically and therefore, theoretically, every case of diphtheria must show the diphtheria bacillus, but this is not always present. It is not found in from 10 to 20% of cases, one of the reasons being that the organisms are deep growing and the culture will not give a positive finding. To aid in the prevention of the spread of diphtheria, two facts should be remembered, namely; that there are different types of bacilli, and secondly, that certain types are more virulent than others. The guinea pig test was mentioned as a very reliable way in differentiating the virulent from the non-virulent bacilli, a negative test being the safest test for the non-virulence of the culture. At present there is no treatment for the removal of the diphtheria carrier bacilli except tonsillectomy.

Dr. Kolmer urged large initial doses of antitoxin for the neutralization of the toxin in the blood and the oncoming toxin. He favors, first, the intravenous method, and secondly, the intramuscular method of administration. Relative to the immunology, the following summary may be given: About 40% of people carry about one unit of normal antitoxin (probably hereditary), this being natural immunity. The Shick test, when properly conducted, is a reliable clinical test or index of immunity. It is used quite freely in the U. S. Army. At the present time a negative

Shick test means five years of immunity, as it has been about five years since the test was first carried out. Concerning active immunity, only 20 to 30% of people have been able to give negative Shick test, which would mean that they are producers of antitoxin.

Diagnosis and Treatment. DR. S. S. WOODY.

The important features brought out are: a typical false membrane, which may be of any color, the commonest locations being unilateral, upon the fauces, larynx and nasopharynx. An isolated patch upon the pharynx is rarely diphthertic. Pain is slight. The temperature may be low, but a high temperature is not incompatible.

The cardinal symptoms of laryngeal diphtheria are croupy cough, impaired voice and dyspnea, increasing. Nasal diphtheria, in many cases, manifests itself solely by a discharge from the nose and at first without systemic disturbance.

Every doubtful case should be treated as for diphtheria; if the culture is positive, well and good, and if not, no harm has been done. The other germs, which may cause an exudate, are the staphylococci, streptococci and pneumococci. The conditions to be differentiated are follicular tonsillitis, Vincent's angina (the exudate here is ulcero-membranous), quinsy, thrush, herpes and the angina of scarlet fever. Laryngitis of measles is often confused with diphtheria, the two diseases, however, may coexist and it is well known that measles cases are prone to diphtheria. Other conditions confused with laryngeal diphtheria are: Laryngismus stridulus, edema of the glottis, tuberculosis, lues, retro-pharyngeal abcess, etc.

The treatment would be very simple for all cases seen within the first 24 hours, namely: antitoxin and rest. Dr. Woody prefers the intramuscular method for the administration of the antitoxin. The dosage depends upon the site of the disease, the age of the patient and his general condition, and upon the day of the disease the antitoxin is given. As to the total amount to be given or to be permitted, Dr. Woody reports that 300,000 units were given subcutaneously in a case with recovery.

In 1000 cases, 40% gave evidence of serum sickness. Collapse and death have been reported, but of such rarity that it should not really be considered. Dr. Woody then covered quite fully the general hygienic and medical treatment.

Particular mention was made in the treatment for laryngeal diphtheria: A canopy and a croup kettle for the production of steam, with the patient's head in the direct path will very often give relief from dyspnea. The application of turpentine stupes to the neck and upper chest is often of decided advantage. Rubbing of the larynx and upper chest with camphorated oil and subsequently covered with hot flannel is another means for relief. The indications for operative interference are well marked dyspnea, with recession of the soft parts of the chest, restlessness and a weak rapid pulse, especially if these symptoms do not show signs of abatement after serum and other measures have been administered. The complications mentioned are: Cardiac failure, paralysis and broncho-pneumonia.

"Municipal Management and Research." DR. CLARENCE W. SCHAEFFER.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

Meeting, April 3, 1918.

Dr. Otis D. Stickney reported a case of Bilateral Acute Otitis Media with symptoms of Sinus Thrombosis.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

Dr. George W. Mackenzie read a paper on Syphilis of the Internal Ear and Eighth Nerve.

A most instructive paper, some of the important features brought are: Its early manifestation in deafness in children, congenital mutism, sixty per cent of nerve deafness in children giving a positve Wasserman reaction. Luetic nerve deafness is usually bilateral. In the acquired types the abruptness and rapidity of deafness is an important feature. In the congenital type it begins about the 6th to the 10th year, and is gradual in its onset.

Some of the symptoms are impaired hearing, appearing suddenly; its bilateral affection; the appearance of vestibular and semi-circular canal symptoms, as vertigo, nystagmus, etc. Another factor brought out is that complications following suppurative otitis media are more apt to occur than in non-luetic. The course of involvement is meninges nerve, followed by inner ear affection.

Dr. A. B. Hirsh, in the absence of Dr. S. St. John, of Akron, Ohio, read a paper, "Bipolar (Oudin and D'Arsonval) currents to remove occlusion of cavities." A demonstration of the instruments used followed.

H. B. COHEN, Reporter.

A Serological Investigation of Vincent's Angina. F. E. TAYLOR AND W. H. MCKINSTRY, *British Med. Jour.*, Jan. 19, 1918.

In view of the confusion that may arise when there is an association of Vincent's angina and a positive Wassermann reaction the authors undertook an investigation to test the relationship between the two. Fifty-five unselected cases of proved Vincent's angina were subjected to the Wassermann test. All except two were negative and it was found that both of these patients had had syphilis several years before. The conclusion was reached that Vincent's angina itself will not give rise to a positive Wassermann reaction and that the presence of such reaction in the course of Vincent's angina spells the coexistence of syphilis, the fusospirillary infection of the throat being an independent or secondarily associated condition. In the absence of syphilis the Wassermann reaction was always negative. ED.